

LISTENING THROUGH TECHNOLOGY:
TOWARD A HYBRID AURALITY PRACTICE

TONY VIEIRA

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Abstract

This research project investigates the role of sound within XR (augmented reality, virtual reality, alternate reality) and location aware media while considering creative practice as research through the creation of two sound-based location-aware media pieces for exhibition (*Strathroy Stories* and *Thing of Shapes to Come*). This project aims to build upon, and bridge the work of scholars and artists working in the disciplines of sound studies, creative practice for XR, and sound and music for media. By tracing a history of technologically mediated sound within artistic practices, traditional and new media, cultural and community practice, and everyday experience I hope to unearth a deeper understanding of the role that technology plays as an interlocutor in our experience of listening.

The central questions that this dissertation asks concern the ways in which technologically mediated sound shapes the experience of both XR and everyday listening. By discussing the history, current state, and potential future of technologically mediated sound in culture, media, and art this dissertation hopes to address areas that will contribute to the existing body of literature and artistic practice in sound studies and sound art.

Dedication

I dedicate this project to my wife, Meltem, for her incredible patience and support throughout this very long process, and to my son, Miles, for his curiosity and interest in what was taking me away from being with him. I would also like to dedicate this to my late mother who, although she never fully understood what I was doing, was always interested to hear about my struggles and victories along the way.

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TABLE OF CONTENTS

Abstract	ii
Dedication	iii
Acknowledgements	iv
List of Figures	ix
Chapter 1 Introduction and Methodology	1
Background and ResearchTopic	1
The Question	4
Rationale	6
Methodology	8
Research Creation	10
Research-for-creation	12
Research-from-creation	12
Chapter Outlines	14
Chapter 2 Power and Presence: A Brief History of Technologically Mediated Sound	19
Introduction	19
Context	22
Power, Presence, and Acoustic Community	24
Sound Mediating Technologies that Shaped Society	24
Resonance	25
Flutes, Horns, and Bells	31
Flutes	31
Horns	33
Bells	36
Stethoscope	42
Sound Recording	44
Microphone & Amplification	49
Technologizing the Sound of Religious Tradition	51
How technology is changing the Islamic Call to Prayer	52
Ezan	54
Cairo	55
Istanbul	57

The Allure of Ezan	60
Modernity, Antiquity, and Acoustic Community	61
Religious Noise	63
Sound as Weapon	64
Radio & Muzak	68
Radio in Nazi Germany	70
Rwanda, Radio, and Genocide	72
Muzak	75
Telephone	79
Smartphone	82
Mobile Prayer Apps	83
Chapter Summary	85
Chapter 3 Sound and Silence in Media	86
Introduction	86
Diegetic and non-diegetic sound	87
Para-diegetic Sound and Sound Artifice	88
Allusional Intent	89
Semiotics and Sonic Experience	90
Sound Artifice and The Sound of Sport	92
Silence	96
Sound and Silence in Cinematic Narrative	97
The Sound of Silence	98
Hush	98
Gravity	101
The Idea of Silence	107
A Quiet Place	109
Chapter Summary	112
Chapter 4 A New Aurality	115
Introduction	115
Sonic Interaction Design	118
Sound as Micro-Interaction Feedback Mechanism	119
Sound as More than Feedback	121

Enabling Sonic Immersion within AR, altR, & VR Environments	122
Immersive vs. Interactive	122
Augmented Aurality	123
Augmented Reality Sound vs. Virtual Reality Sound	125
Interaction Analysis as close reading of sound-based mobile apps	126
Dark Echo	126
Audio Defence: Zombie Arena	128
Sound Swallower	129
H _ _ R	132
Polyfauna	133
Inception	134
Summary of App Analysis	135
Sound app as sound art	136
Sonic Cartography	138
Place-making via sonification and participatory sound projects	138
Not to be immersed in the sound, as much as to be immersed in the listening	139
Chapter Summary	140
Pokémon Go	142
Chapter 5 A Sound Practice	144
Introduction	144
Locative Listening and the Construction of Dynamic Hybrid Space	145
Pervasive Digital Media and the Birth of Hybrid Space	146
Dynamic Hybrid Space	148
Locative Listening as Virtual Embodiment	149
Mobile Listening	151
Mobile Listening as Private Public Space	152
Locative Listening	153
Locative Listening as Subtle Virtual Reality Experience	154
Augmented Reality & Augmented Aurality	155
Location Aware Hybrid Reality Projects	159
The Other Side of OZ (Part 1 & 2)	160
Alter Bahnhof Video Walk	161

The Chez	163
Strathroy Stories	165
Narrative Cohesion and Immersion across Physical Space	167
Sensorium Activation	167
Narrative Overlap	168
Thing of Shapes to Come	168
Locative Listening Podcast	169
The Mediation is the Message	171
Locative Listening Initial Experiments	173
Norway recordings	174
Bergen Harbour	174
Schizophonia and a Hallucinatory Sound Accident	175
Reflection on a Hallucinatory Locative Listening Experience	175
Chapter Summary	177
Problems with Locative Listening	179
Chapter 6 Conclusions	181
Introduction	181
Background and Context	181
Overview of Research Objectives and Findings	184
Mediated Listening in History and Lore	186
Sound as Immersion Enabler	187
Sound Immersion and Hybridity	189
Limitations and Future Work	191
Significance and Impact of this Research	192
References	196
Books & Journals	196
Web Sites & Digital Media	207
Mobile Apps	210
Film & Video	211
Appendix	212
Strathroy Stories	212
Thing of Shapes to Come	225

List of Figures

Figure 1: <i>Strathroy Stories</i> Conference Didactic (Victoria)	213
Figure 2: QR codes for Recho mobile app download	214
Figure 3: Radio Aporee desktop interface for Galway, Ireland exhibition	215
Figure 4: Radio Aporee desktop interface for Galway, Ireland exhibition (satellite view)	215
Figure 5: Echoes.XYZ Creator Page (Orlando Campus)	216
Figure 6: Echoes.XYZ Creator Page (Orlando Campus close-up)	216
Figure 7: Satellite map of Strathroy	221
Figure 8: Map of Strathroy	222
Figure 9: <i>Thing of Shapes to Come</i> cover art	223
Figure 10: Echoes.XYZ Creator Page: <i>Thing of Shapes to Come</i>	229
Figure 11: Echoes.XYZ: <i>Thing of Shapes to Come</i> (Galway, Ireland Satellite map)	230
Figure 12: Radio Aporee : <i>Thing of Shapes to Come</i> (Montreal, Canada Satellite map)	230

Chapter 1

Introduction and Methodology

Background and Research Topic

As I left Ataturk International Airport I was struck by a distant sound— like a single, distinct thread woven into the fabric of a rich and complex city soundscape. Piercing the urban din of Istanbul was the sound of *ezan*— the Islamic Call to Prayer. To my western ears it had a mechanical quality, likely due to the air raid siren-type speakers used for broadcast, while at its core that the fluidity and warmth of a human voice. Amid the cacophony of car horns, market shopkeepers and radios, was the sound of a 1400 year old tradition, creating punctuation within a chaotic and frenetic overcrowded city environment.

Over the days that followed I would anxiously await the next *ezan* and was continually mesmerized by not only the complexity of the improvised recitation but also the varied nature of my sonic experience. In addition to spatial determinants such as whether I was in Taksim Square, Sultan Ahmed Mosque, or The Grand Bazaar, contributing to the sonic complexity of *ezan* was a layering effect as a result of two and at some locations three different *muezzin* (*ezan* reciter) reciting simultaneously. At Sultanahmet Square, I could hear *ezan* coming from three separate mosques; all performed using the same opening *makam* (Turkish melodic modal system) but each unique in its deeply expressive exploration of the scale. The *triple ezan* of Sultanahmet, as it is referred to by some, almost seemed orchestrated, as initially one *muezzin*'s recitation would patiently follow the next until the voices of three *muezzins* eventually overlapped in a rich undulation of sound. The most dramatic aspect of the experience was the capacious and almost suffocating silence that followed the final and singular recitation of “*Lā ilāh*illa ‘llāh*” (“There is

no god besides Allāh”). The sonic emptiness created after this final statement seemed to serve as a meditative space for the listener, before once again becoming immersed in the sensorial overwhelm that is Istanbul.

My experience of ezan while in non-urban centres of Turkey was quite different from that of ezan in Istanbul. While in Çeşme, an Aegean seaside resort village, I would hear ezan with the same regularity as in Istanbul but the sonic experience was very different. As the day progressed I began to realize that although I could hear ezan coming from three different locations within the village, there was a homogeneity to the wash of sound. Upon careful listening to ezan field recordings that I collected in Çeşme I began to suspect that these were pre-recorded broadcasts of the same recording. An uninspiring and banal statement of ancient and sacred tradition for rural Turkey, while a living and uniquely improvised version was reserved for urban centres. What was going on here? After speaking to residents of Turkey on the matter I learned that the modern tradition is that large metropolitan centres (Istanbul, Izmir, Ankara, etc.) have ezan performed by a muezzin assigned to a neighbourhood mosque, while in smaller towns and villages (Çeşme, Rize, etc.) pre-recorded ezan is transmitted from a central location to receivers and loudspeakers at all mosques in the area. This polarized approach to religious tradition was intriguing to me and I began to research and write about the topic of “standardized ezan” and in doing so discovered a range of ezan practices and problematics in countries as diverse as England, Egypt and Indonesia. My research papers on the topic were subsequently presented at several conferences in Canada and the U.S.

My research into sound in relation to call to prayer began to raise questions about the nature of sound as it relates to: place-making, individual and community identity, transmission of

ideological meaning, and the balance of power. Of particular interest to me was how the use of loudspeaker technology had changed the experience of ezan for the Muslim and non-Muslim listener. These questions began to inform; my creative work in the fields of augmented reality, virtual reality, and location-aware media; my educational practice, as I began to develop and deliver lessons and workshops for both students and teachers at elementary, secondary, and post-secondary levels in the areas of AR, VR, AltR, and Digital Humanities; and my research into the process and resultant outcomes of my artistic and educational practices. Our varied experiences and relationships with technologically-mediated sound soon became an ongoing and nearly all-consuming concern in almost every aspect of my life.

Technologically mediated sound is not a new phenomenon. One could posit that since the first modern human expelled the air from their lungs into a perforated tube constructed of bird bone some 40,000 years ago, we have been producing and experiencing sounds through a technological filter.¹ This intermediary step between the sound of a person expelling air and the reception by the ear presents a plethora of phenomenological questions regarding sound, technology, and experience. Beyond the input and output experience of this basic technology there is the question of embodiment for the user of the instrument and the ways in which this may have translated the act of music-making into an integral element of religious and shamanistic ritual, evidence of which is present in many religious practices today. The use of sound producing technology raises questions regarding the “power of music” and the fact that in some religious traditions “music” is inadmissible as part of worship.

¹ @UniofOxford, "Earliest Musical Instruments in Europe 40,000 Years Ago | University of Oxford," University of Oxford, , accessed November 30, 2016, <http://www.ox.ac.uk/news/2012-05-24-earliest-musical-instruments-europe-40000-years-ago>.

The Question

While I had initially chosen “the Islamic call to prayer” as my research topic, as I progressed through the early stages of research I eventually broadened my topic to explore, in a very general way, the idea of “sound and experience,” and eventually clarified and focused my topic on a study of the history, current state, and potential future of technologically-mediated sound.

Although this title may also seem expansive, over the course of my research and creative work in this area I was able to clarify a handful of directions that I could take in investigating the idea of technologically-mediated sound. These points of focus grew naturally out of many years of personal experience as an educator, musician and composer, and more recent work in the fields of augmented reality, alternate reality, and virtual reality.

The years that I spent performing music for audiences large and small, were grounded in a mindset focused on the supremacy of sound. As I began to compose music for a variety of media (independent film, television, animation, interactive media) I started to become aware of the secondary nature of the role that music performs in much of the content for which I was an audience member. This was a hard pill to swallow and led to many conversations with content creators for whom I was providing music, that in some cases led to my dismissal from the project due to my lack of understanding about the role of music in visual-centric methods of content delivery. Over time I came to understand the role that music, and I as a composer of music, needed to play as part of these works; music serves the picture. The idea that “music serves the picture” became a frequent theme of conversations with not only film makers and content creators but also with other music composers. It was clear to me that music was thought of as a “second class citizen” within the multimedia content. During spotting sessions with independent

film makers I would often be told where he or she needs music to “fix” a scene that just wasn’t working. In these instances music was anything but “second class,” it was expected to be the saviour.

As a music educator, music was the principal focus of my day to day experience, albeit not always pleasant sounding music. From beginner clarinet classes, concert band and jazz band to guitar classes and electronic music, I was fortunate to be able to explore a broad range of technical and creative activities with students as a classroom music instructor. After leaving a full-time teaching position to explore creative musical possibilities I decided to undertake graduate studies at York University. As part of my doctoral course work I enrolled in an augmented reality course in the Film Department called *Future Cinema*. This course would eventually inform my dissertation research topic.

While creating augmented reality projects I also studied existing AR projects and was struck by the lack of immersion that I experienced with the vast majority of these works. Although many were dazzling due to their use of this new, immersive technology, they did not engage me in a comprehensive way. I was hoping to be transfixed by these projects the way I am when watching a well crafted film, but I was not. When beginning my final project for the Future Cinema course I created an augmented reality piece called *Vessels of Memory*. For this project I composed original music and soundscape in order to attempt to create the sort of immersive experience that I had envisioned for AR. I was satisfied with the results of my efforts and in doing so, began to develop my research topic, which at the time was simply an exploration of the use of sound and music in existing augmented reality and virtual reality work. Unfortunately, when I explored existing AR and VR projects I could find very few that used music and sound in

a role that was little more than a stock music track to provide something to listen to while exploring the experience. As a result of this realization I began to think about how sound is used in traditional media (film, television, video games) as well as everyday experiences and settings ranging from the sound of a restaurant or shopping mall to the sound of car door closing or refrigerator door being left open. The question that I began to ask myself was “how does technology change the way we experience sound?” Interestingly, this question led me back to the beginning of my dissertation research interest in the standardization of the Islamic call to prayer. As a result, this research interest constitutes a substantial portion of chapter two.

The central questions that this dissertation asks concern the ways in which technologically-mediated sound shapes the experience of listening to: each another, our natural and manufactured environment, and technologies that produce sound; as well as our relationships with the things that produce and reproduce sounds, and our resultant technologically-mediated relationships with each other. By discussing the history, current state, and potential future of technologically-mediated sound in media, art, and education, this dissertation hopes to address areas that are, as a result of my personal experience, of interest to me as a scholar, artist, and educator.

Rationale

Although there has been a great deal of research and writing on topics relating to sound and experience, and sound in media, little research exists with regard to the experience of technologically-mediated sound, and particularly with the approach that I have chosen. The approach that I take with this dissertation: traces technologically mediated sound from very basic

technologies to current interactive media, unpacks sound and the use of sound technologies in film & episodic narratives, surveys sound-based art projects of my own creation and by other artists, and finally addresses the idea of learning to listen which I refer to as “awakened aurality.”

The goal of my dissertation project is to investigate the ways in which technology functions as a mediation between sound creation and human experience. My chosen research process refers to technological-mediation from basic forms to those that are currently developing along with their accompanying technologies. This approach allows me to constantly look forward and backward as a way of constantly reminding myself of the ways in which technologically-mediated sound has been utilized in a successful and meaningful way, thus informing my own direction with regard to the use of these approaches as I develop my own creative and educational projects.

My research contributes to the field of sound studies by engaging with the idea of “sound and presence” with regard to the use of technology as a tool for influencing the audience’s experience of listening and their perception of place and embodiment. Whereas sound walks are traditionally intended to make the listener aware of their real environment, my research investigates the ways by which the use of technology can allow the listener to simultaneously be aware of their real and virtual environment. My discussion of film and television applies a similar analysis to the viewer experience, and at times to that of the characters within the narrative and how this meaning is communicated to the viewer.

Methodology

During a visit to Istanbul in the summer of 2010 I decided to do some fieldwork, as I had chosen to apply to do a PhD at York and thought that I should begin to think about a research topic. On this trip I brought along a styrofoam head, a ZOOM H4N handheld recorder, and two shotgun microphones. My plan was to collect binaural recordings of the call to prayer in as many locations as possible. At the top of my list was Hagia Sophia, the former Greek Orthodox Christian cathedral, that was converted to an Ottoman imperial mosque in 1453, and in 1935 it was converted to a museum. (In July of 2020 Turkish president Recep Tayyip Erdogan ordered the museum be converted back into a mosque). The tourist experience of Hagia Sophia begins with a security check. When armed security guards asked me to open my bags and found a head inside one of them, I was asked to step aside. After speaking to other security personnel, whose expressions quickly turned quizzical and concerned, the guard returned and sternly told me that I would not be able to make my styrofoam head into Hagia Sophia. I was disappointed, but did not argue with the man equipped with a sidearm. Although I was not able to collect field recordings inside Hagia Sophia, I would go on to make recordings in several outdoor spaces as well as Blue Mosque and Eyup Sultan Mosque.

On one particular day I decided that I should record a full day of call to prayer. I woke up at 4:45 am and took a taxi from Bakirkoy, the neighbourhood where I had been staying, to Sultanahmet Square, in the heart of historic and touristic Istanbul. Later that day, while recording the Ikindi ezan, in the late afternoon, “when the shadows cast by objects are equal to their height”, I found myself overwhelmed by the sound. The sonic overwhelm of Istanbul seemed to be masked by the voice of the muezzin. The sound of traffic, tourists, and watermelon salesmen

disappeared as I was now only aware of one human voice. I was swimming in sound; Immersion. Then I slowly became aware of myself in that moment; Presence... Embodiment. My attention slowly shifted to my surroundings; Place-making. I noticed a stream of men walking into Sultanahmet Mosque as they had been called to pray; Power. And the way that this group of hundreds of people responded to a call that had a similar function and meaning to all of them; Acoustic Community.

Upon my return to Canada I sifted through my recordings and edited and labeled the recordings from that day at Sultanahmet Square. A few weeks later I was going to the Rex on Queen West to meet a friend and listen to a jazz group. I had some time to kill so as I stood at corner of Queen & McCaul I put in my EarPods and played one of the ezan recordings on my iPhone. What happened next was surprising. I found myself covered in goosebumps as I seemed to relive my experience at Sultanahmet Square but in a new way; Hybridity... Virtual Embodiment. The soundscape of Istanbul was overlaid on that of downtown Toronto; Transphonia.

At the time of my Istanbul and Toronto experience I did not have names for these sensorial events, I only had the feelings. It was through the process of research and creation that I began to attach labels to these feelings and phenomena, and shortly there after I began to explore the application of these phenomena in the form of creative projects for XR.

Research Creation

Contemporary sonic experience is layered both in terms of perception and function. Mobile technologies have given us the power to make *location* sound optional as we can now mask or, with the aid of noise-cancelling headphones, subvert our real sonic environment and replace it with our choice of music playlist, podcast, or audiobook. Sonic experience is unique in that it is the only one of our senses that we can effectively, and safely, subvert or reconstitute in this way.

Through interaction analysis as close reading² I will explore sound and music for interactive media/video games and nascent technologies such as augmented reality and virtual reality in order to gauge the current state of the relationship between sound and visual in the realm of entertainment. Of particular interest is the relationship that exists between adolescents/teens and their mobile devices, and specifically the ways in which they use their smartphones, devices evolved from the telephone, as primarily visual interfaces. For example, texting is much more common than voice calling, and while playing games that are designed with accompanying music and sound design users will very often play with the sound disabled. Although when I have asked mobile gamers about this sonic subversion, their typical rationale will have to do with a desire to avoid disruption to nearby individuals, this does not change the fact that they are drastically altering their experience of engagement in a way that they would not with linear or traditional media. To watch a film or television program with the volume off is almost unheard

² “Interaction analysis as close reading” is a term that I have coined in order to describe the process by which I will evaluate sound-based mobile apps. This process aims to: define and contextualize existing and author-generated terminology, evaluate the potential end user experience by personally using the apps from a qualitative research perspective, and finally compare and contrast the effectiveness of the mobile apps from various perspectives including: interaction design, immersive vs. interactive, comprehensiveness of sonic experience, sound app as sound art piece, and possible applications for these apps beyond their intended purpose.

of, yet with this form of entertainment it is quite acceptable. This raises questions about a potential (re)turn to a postmodern version of the silent film in which the contemporary mobile media consumer dismisses elements of their experience that they may deem irrelevant or superfluous to the desired gaming experience. Unlike silent film where synchronized sound was technically impossible, in this “deafened” mobile gaming practice users are choosing to ignore 50% of their chosen sensorial experience.

A portion of this research project will be in the form of research creation, as I have and continue to build creative projects and educational materials that explore elements of AR, VR, and AltR through the purely sonic as well through multi-sensory creations.

SSHRC (Social Sciences and Humanities Research Council) defines research-creation as a research activity or “approach” that “forms an essential part of a creative process or artistic discipline and that directly fosters the creation of literary/artistic works.”

In their article “Research-Creation: Intervention, Analysis and Family Resemblances,” Owen Chapman and Kim Sawchuk define “research-creation” as one that describes a conglomerate of approaches and activities that incorporate creative processes and involve the production of artistic works in the context of academic programs. They go on to suggest four modes of research creation that include: “research-for-creation,” “research-from-creation,” “creative presentations of research,” and finally “creation-as-research.” I would characterize my project as a hybrid of “research-for-creation” and “research-from-creation.”

Research-for-creation

With regard to research-for-creation, Chapman and Sawchuk go on to say that “it is important to acknowledge that any creation, even (and especially) creation that is pursued as a type of research in and of itself, involves an initial gathering together of material, ideas, concepts, collaborators, technologies, et cetera, in order to begin. This gathering is “research” in the same way that reading through recent journal articles, tracking down important references, or conducting interviews are key elements of producing various academic contributions to knowledge...”

Research-from-creation

With regard to Research-from-creation, Chapman and Sawchuk state that “performances, experiences, interactive art works, et cetera can also be ways of generating research data that can then be used to understand different dynamics.” And that “the work itself can be used to generate information on user-responses to help build the project in question, as well as future initiatives. In this case, there is a form of iterative design or testing that involves the participation of individuals or groups who may be an intended audience.”

My project is a hybrid of these two models due to an approach that observed and analyzed a variety of mediated listening situations and their resultant outcomes. These findings were valuable in order to better understand how such an approach to listening could achieve similar states of experience, but with the aid of AR, VR, and locative technologies.

The creative work that was produced furthered and deepened my understanding of the elements in this research. The process of producing, testing, and publicly deploying creative projects

provided a feedback loop between the nature of the work, with regard to content and technical aspects, and the resultant experience for the user.

This research project is a study in *listening through technology*. This simple description completely embodies the scope of my dissertation while simultaneously seeming to not describe it at all. Because the chapters discuss the relationships between listening and technology in a broad range of settings, without an adequate introduction and explanation of my intentions this project could appear to be a series of unrelated sections. I am confident in my intention of investigating listening through technology from a variety of vantage points as a valid method for better understanding technologically mediated listening. The various chapters investigate ways of listening through technology from perspectives including that of a mass media audience member, mobile technology user, student, educator, media art creator, character within a fictional narrative, and an individual experiencing a basic sound technology for the first time. Throughout this research project effort is made to investigate the production and reception of sound through technology and in most cases this includes a discussion of the cultural implications therein.

The approach that I have taken in this dissertation is to study listening through technology with an ethnographic lens as well as from my own experience as both a listener and a creator. In order to avoid writing an autobiographical work I have endeavoured to investigate historical examples that illustrate the idea of technologically-mediated sound as well as mainstream media works that explore the use of sound as an agent of viewer engagement.

Each chapter of this dissertation attempts to address my central concern of how listening through technology shapes experience. Each chapter relates to this concern in a meaningful way because in isolation they focus on a specific form of listening that is mediated by technology, but

the central concern of the dissertation as a whole is the way in which the experience of listening can be altered by either the chosen form of technological mediation or the way in which technology can manipulate the transmitted meaning of sound to the listener. In the case of locative sound, the experience of listening is altered by physical space, while in the case of sound and silence in media it is altered for the viewer by its relation to narrative, and it can alter the narrative by its relation to the characters therein.

Admittedly, there is a research creation thread that runs through this dissertation. I have, perhaps selfishly, tried to focus on areas that are not only of great interest to me currently but that will further my understanding of real-world applications of use to me as a content creator and educator in the coming years.

Chapter Outlines

This dissertation continues with an additional six chapters that investigate facets of technologically-mediated sound and various end-user human experiences enacted through the relationship between real sound, technology, and listening. The examples and various material cited and discussed in this dissertation are approached through a lens that is at times empirical, if verifiable data is available, while at other times the examples are discussed with a theoretical approach. Whenever possible, I have made efforts to discuss case studies and specific examples cited in this dissertation with approaches that are both empirical and theoretical.

“Chapter 2 Power and Presence: A Brief History of Technologically Mediated Sound” investigates examples of mediated sound throughout history and mythology, establishing the notion of mediated listening not as a novel human experience dependent upon streaming audio or

GPS, but one that has a long and varied history. Doing so allows for a perspective that focuses more on the effect of this form of listening rather than simply the technologies that enable it. This investigation provides valuable context about forms of mediated listening as they relate to power, presence, placemaking, community, entertainment, learning to listen, and sound as an apparatus for immersion and hybrid experience. The thought that the use of technology to mediate sonic experience could have such wide-ranging implications for the listener was a revelation for me. Whether it was the correlation between locations of resonance and that of prehistoric cave art, the intimacy of a medical examination with the aid of a stethoscope, or the power of Muzak and Stimulus Progression to govern human behaviour, it became clear to me that the aid of a sound mediating technology had far reaching implications for both projector and receiver of those sounds.

“Chapter 3 Sound and Silence in Media“ expands on the previous chapter’s discussion of mediated listening throughout history by analyzing and contextualizing sound and silence in television and cinema with regard to the way highly curated and edited sound can deepen the viewer experience. Television and cinema are chosen as research areas as they are not only ubiquitous forms of sound being delivered in a role that is mostly secondary to that of sight, but also because these everyday forms of content delivery have long established the way in which audiences expect to experience sound accompanying visuals. This area of study is essential in order to model the use of sound in XR, not only in a manner that would be understood and accepted by contemporary audiences but also as a reference point for the creation of modes of sound-use that challenge long-standing conventions. The activation of haptics through the use of transducer microphones in Alfonso Cuarón’s *Gravity* demonstrated a kind of virtual embodiment

for the viewer as the seemingly insignificant on-screen action of tightening a bolt could become a significant sensorial moment. The use of a laugh track could enact a kind of virtual acoustic community across a wide and diverse broadcast audience. The act of laughing together established a sort of agreement among viewers and an invisible social bonding. This sort of auditory cue following an exchange between Monica and Rachel on *Friends* can provide a momentary repose of ideology and allow both democrats and republicans to share in a moment.

In chapter 4 *A New Aurality*, this study continues on a timeline of mediated sound with a focus on technologies and applications in which sound is the primary source of sensorial engagement, and the resultant forms of immersion and hybridity that are of particular interest to my research. This chapter includes an interaction analysis of sound-based mobile apps. The knowledge gained from this analysis serves as a way of better understanding how successful sonic immersion can be achieved through a carefully crafted and curated experience within a mobile app. This informs not only potential best practices when creating sound-based immersive and hybrid experiences but also provides a better understanding of the typical user experience within these environments. This analysis raises questions regarding mobile app user experiences that led to feelings of anxiety, fear, distraction, boredom, mindfulness, and a newfound awareness of the potency of engaged listening. Knowledge of such user experience is essential in developing sound-based projects as well designing sound to accompany visual XR work as is discussed in the following chapter.

Chapter 5 *A Sound Practice* is a discussion of artistic practices that attempt to push the limits of technologically mediated experience with the hope of creating deep sensorial works with minimal technology. This approach is one in which I firmly believe due to its ability to

reach the widest possible audience. The distribution of experiential content in a locative manner sidesteps the need for an audience to enter a concert hall, gallery, or recital hall. Locative media takes the experience to the audience and in the case of locative listening, hybrid experience is enacted for the user in a way that takes space and place into consideration, making location a significant element of the overall sensorial experience.

The Alter Bahnhof video walk by Janet Cardiff and George Bures Miller provided valuable context and points of reference with regard to states of hybrid experience and how I could utilize and expand on these in my own practice. Their use of real world and virtual world reference points allowed the user's focus to shift between these two divergent, yet simultaneously existing worlds, thus creating states of hybridity that seemed to be deeply engaging. This piece informed my own sound-based work in projects such as Strathroy Stories location-aware sound project and the Locative Listening podcast.

My own creative projects expanded on the form by stripping away the curated visual focus, allowing the user more agency within their experience. The sound pieces within my projects often make reference to particular physical elements in the real world, although in a more impressionistic manner. For example, a sound node within the Strathroy Stories project called "The Night that a car drove through my house" tells the story of the night a car drove through my house. For real. For exhibitions, this node was placed at the front of a building that was within close proximity to traffic, allowing for not only hybridity but ideally a heightened sense of anxiety for the user as they become acutely aware of passing cars and the thought that one could jump the curb and crash into the building next to which they are standing. This use of sound without visual curation allows the user to construct their own multi-sensory narrative to

accompany the sound piece being delivered. This approach provides another layer in the definition of the agency of mediated sound. This agency was discussed in earlier chapters with regard to sound's potency when mediated by technology, but with locative listening and carefully crafted hybrid listening the sound has agency, with a layer of that being directed by the user. In a kind of *Secret Path: Choose your own Ending* book, the user consciously, or unconsciously, imbues their hybrid sonic world with meaning that is based on their own experience, values, and beliefs. This personal narrative in essence writes their in situ sensorial narrative within a location-aware sound project.

The chapters in this dissertation function as a timeline of mediated listening leading to next steps in a practice that involves creation, research, and the imparting of knowledge of, and passion for, the exploration of listening.

Chapter 2

Power and Presence: A Brief History of Technologically Mediated Sound

There is a siren that sounds in our small town to announce the curfew. At noon and at 10 p.m. Every time the siren sounds all the sled dogs howl, and I imagine that they think there is a large, loud god dog that rules the land howling. I equate this with religion. A short-sighted and desperate attempt for humans to create reason and order in a universe we can't possibly comprehend.

(Tagaq, 2018)

Introduction

Our contemporary experience of sound and technology is one that is, for the most part, private. It is private in that an individual often listens to music, podcasts, telephone conversations, etc. in a manner that allows the sonic content to be heard by only him. This is a very intimate listening experience. The sound is moving directly from the source of production, or, more accurately, reproduction, into the ear with little intervention due to the fact that this sort of listening is often experienced through in-ear headphones of various types. With the exception of the subtle mingling of in situ ambient sound, there is little un-curated sonic input, thus little information to create a sonic experience resembling what would have commonly been felt even a generation ago. We can increase the volume of the listening device so that our chosen sound experience overpowers the in situ, and likely unwanted, soundscape. The privacy of this sort of listening allows the listener to at once be in their physical world while part of their awareness, or presence, is inside their own private sonic world. They can withdraw into a personal sonic world small enough that they can exert complete control over it (Bull 2007:9).

Another way in which the experience of sound and technology is private is in the way that we communicate with one another and, resultantly, with ourselves. Even though a text message or email is ultimately silent, arguably a certain amount of internal sound occurs, known as IRV or *internal reading voice*, when we read these messages. “Many individuals report routinely experiencing IRV’s, which often have the auditory qualities of overt speech, such as recognizable identity, gender, pitch, loudness, and emotional tone” (Ruvanee, 2016:1). Many will be familiar with the adage of “email has no tone” as a way of expressing that written communication is devoid of the context provided by sound. I have sent many email and text messages that have been misinterpreted due to my decision to type the words that I was thinking at the time, without considering the meaning of the words in the abstracted state of reception by the reader who will, using their IRV, apply tone, pitch, and inflection of their choosing rather than that of my intention. This process often creates communication that is fundamentally flawed. One could think of it as music score without articulation and dynamic markings. The information is accurate but the essence of the end message intended by the composer is missed. Although this is not a new phenomenon, as it has existed since the beginning of the written word and its eventual widespread dissemination with the advent of the printing press, the rate at which text-based messages are sent and received, due to the pervasiveness of mobile technology, makes the IRV a sort of translator, albeit potentially unreliable with regard to accuracy.

The current state of communication, strangely, seems to be predominantly one of silence. The majority of communication in which I engage on a daily basis is silent in nature. Even if I use the speech to text function of my iPhone, when the message is received by the intended recipient, the tone of the message is likely to be different from that which I had intended. Even if

the recipient uses the text to speech function of their smartphone it is unlikely that the intended tone of the message will be delivered to the recipient. The pervasiveness of visual forms of text-based communication such as email, SMS (short message service), and the plethora of social media posting and direct messaging formats, could even be changing the meaning of the word ‘talk.’ When Mary says, “I talked to John yesterday,” it may in fact mean that Mary and John exchanged text messages or that they both commented on a social media post. Visual text-based modes of communication are forms of information exchange that in some ways are, or have the potential for, more comprehensive communication than the traditional definition of ‘talking.’

Although email and SMS are devoid of tone or inflection, this mode of information exchange can include not only language in the form of text, but also has the potential to include photo, video, audio, emoji, and any combination of these media. A message sender could conceivably compose a very comprehensive and expressive message by incorporating several, or even all, of these available media, creating a multimedia message that delivers a potentially enormous volume of content and context.

The way in which we refer to communication is changing, in that it is now common to refer to visual communication as oral communication. This may not be so far from the truth, or at least *a* truth. “Are you seeing this sentence or are you hearing it? You can easily answer without checking whether you are using your eyes rather than your ears. You can tell by introspection” (Sorensen 2009:128). The question of whether visual text-based communication is ‘talking’ seems to arise in my mind due to the absence of sound production in this form of communication. The Sorensen quote not only brings this into question, but seems to quickly validate visual text-based communication (VTBC) as a form of talking, albeit one that utilizes

the inner ear. My IRV is talking to me, in my own voice, as I reread this sentence. My earlier assertion that “the current state of communication, strangely, seems to be one of silence” requires some qualification. Never before has there been more communication between individuals and groups of individuals providing connection between people regardless of their proximity to one another. The same mode of communication is often used whether the individuals are in the same building or on opposite sides of the world. This constant and ease of human connection is afforded thanks to SMS (short message system), MMS (multimedia message system), and social media. Group chats on similar messaging systems and social media platforms allow users to communicate as part of a group, enacting a kind of community, although not an acoustic one; this community is mute. Perhaps the current state of communication is not silent but intimate and internal. VTBC creates a state of exterior silence with a simultaneous state of interior noise, as the reader of email, SMS, MMS, social media posts and messaging may be experiencing the interior aural equivalent of a cocktail party being held at the one-yard line of a Super Bowl game in Times Square.

Context

This chapter investigates examples of mediated listening throughout history and folklore and functions as introduction to the type of listening that will be discussed in later chapters, that is, listening through technology in a variety of forms. Each example presented in this chapter is discussed with regard to its use of technology and the resultant relationship enacted between sender and receiver. In addition to investigating the way that mediation impacts the experience of listening, each example will be discussed with regard to its ability to enact a relationship of

power or presence, or the creation of auditory community. These distinctions are made as a way of establishing a language for discussing mediated listening with regard to its past and potential future use within a variety of XR environments. The state of ‘embodiment’ is something that is frequently referred to for those working in XR as it is a measuring stick for efficacy of such project environments.

I was recently assisting Jeffrey Stanzler (Chapman University, Los Angeles) with the exhibition of his project, *STATE POWER VR*, at *FIVARS* (Festival of International Virtual and Augmented Reality Stories) in Toronto and was reminded of the power exerted upon the user in a well crafted VR environment. In this piece, users donned *Oculus GO* VR headsets and entered a 10’ x 20’ enclosure designed to simulate a detention cell in a dystopian future United States. While inside the environment users were forcefully instructed to get on their knees and put their hands behind their back while detention officers and guards yelled instructions at them. This experience enacted all three states discussed in this chapter. A visceral state of an imposition of power was experienced as users felt helpless and at the mercy of their virtual captors, a state of presence was enacted as they became acutely aware of their unusual and submissive body posture as they were forced to their knees, while a sense of community was instantly created between these individuals who suddenly found themselves as part of a group of captive American citizens. I mention this project as a way of illustrating the function of the discussion that follows. The knowledge of the potential states enacted through technologically mediated experience provides context for discussions of XR and hybrid listening in later chapters.

Power, Presence, and Acoustic Community

Although Barry Truax defines “acoustic community” as one in which sound “creates a positive definition and not a negative one,” (Truax, 1984:66) I will endeavour to explore the ways by which technologically mediated sound exerts a force that creates community, regardless of the implications. I will discuss a variety of examples and argue that they can be characterized as technologically mediated sound exerting its force to create what is at times a state of presence, an imposition of power, and sometimes both. Truax states “the changes in listening habits brought about by audio technology are not only important to the student of communication but may also interest the more general overseer of society” (Truax, 1984:66). These “changes in listening habits” are precisely what I intend to investigate in this chapter as a way of contextualizing the lineage of sound technologies that have brought us to our contemporary state of listening experience. Truax says “the experience of ‘cutting oneself off’ from the environment through portable headphone listening, or the deliberate use of radio and background sound to create one’s *own environment*, may be symptomatic of a general trend away from environmental awareness and community involvement” (ibid:159). The latter two trends are of particular concern to this dissertation project with regard to engaging individuals through sound-based art projects and encouraging deeper listening in everyday life.

Sound Mediating Technologies that Shaped Society

In this section I will present examples of sound mediating technologies from history and mythology. This section, and the examples presented herein, are essential to the overall dissertation project as it argues that the power of mediated sound is not a result of the kind of

technology used, but the fact that the mediation itself makes the resultant sound far more significant than it would be without technological intervention. The examples discussed in this chapter explore the ways that harnessing the power of mediated sound can result in situations of power, presence, and aural community, respectively. This investigation is a vital step in better understanding how mediated listening encounters can shape an individual's experience of place, identity, community, etc. The knowledge gained through the investigation in this chapter and the one that follows will inform the following chapters as this dissertation continues with a discussion and analysis of a variety of XR projects.

Resonance

The sound of footsteps following behind me as I walk along an alleyway can be perceived as a threat depending on a variety of factors including time of day, the presence of others in the same alleyway and whether I am walking as part of a group or on my own. If I were walking alone along an empty alleyway at night, the semiotic translation of the footsteps following behind me would likely activate some form of fight or flight response within me. The sound of only my own footsteps reverberating, due to hard material surfaces and long empty physical space, in a similar setting would likely engender a similar sense of anxiety but for a different set of reasons. The focus of this section is the resonance of my footfalls rather than the anxiety that they cause and I will argue that resonance is one of the earliest forms of technologically mediated sound.

During his martyrdom Vincent (of Saragossa), after having been tortured, was left alone in a cave; there, after a while, he started to sing, praising the Lord for the marvels of Creation. Prudentius writes: 'to the sweet song of the martyr, as an emulating voice, answered the echo of the concave space.' The guards, listening, heard many voices singing with Vincent; impressed by the beauty of the sounds but wondering who could be singing with the martyr they came and looked but, of course, they found him alone. This happened several times, and in the end, they came to the obvious conclusion Vincent must be being accompanied by a choir of angels. (Reznikoff, 2006:78)

The reverberation and long delays created by the resonance inside the cave in which Vincent of Saragossa had, according to legend, been tortured and eventually left alone, created a sound experience for the listener that was unlike any that they would typically encounter. The unusual nature of the sound, coupled with the unique situation of the person producing the sounds,³ were enough to produce a type of mythological explanation for the sound occurrence. The story of Vincent of Saragossa is an example of an accidental use of resonance as sound mediator. I will present other examples, in story, legend, and lore, where the resonance of physical spaces is intentionally, and sometimes unintentionally, utilized as an early form of technologically mediated sound.

In the case of resonance as sound mediating technology I use the term technology to refer to the naturally occurring resonance being used to achieve an end, sometimes desired and sometimes accidental. *Merriam Webster* defines technology as: "1 a: the practical application of knowledge especially in a particular area; 1 b: a capability given by the practical application of knowledge" (Merriam Webster, 2018). The "knowledge" as it relates to resonance refers merely

³ According to legend, Vincent of Saragossa endured several forms of torture, and through it all he maintained a peaceful demeanour.

to the individual's awareness of the fact that their actions under specific conditions result in a unique outcome.

The idea and experience of silence are of particular significance in this section as they relate to resonance within caves and the ways in which our ancestors may have utilized this resonance to break the state of silence. Anyone who has been alone in an unfamiliar space, such as a subway platform or corridor leading to the platform, an empty and unfamiliar house, or a cave, will be familiar with the feeling of solitary silence in those spaces, and how it typically holds a very different meaning from solitary silence experienced while in one's own home, car, or office. Unfamiliar surroundings seem to imbue silence with a feeling of uncertainty or even anxiety, as if something untoward could happen at any moment. The same sort of silence in familiar surroundings could generate a feeling of relaxation and peacefulness. When we find ourselves in these situations of solitary silence, we might whistle, hum, drag our feet, or say "hello" into the empty silence. We are eager to break the silence and make ourselves feel less alone.

Perhaps uneasiness with silence might explain the existence of cave markings in North-Central France. In a study carried out by musicologist, Iegor Reznikoff, it was found that cave paintings of varying degrees of complexity were found in locations within caves that have "very rich acoustics" (Reznikoff, 2006). As Reznikoff, moved through the darkness of the French caves producing sound and listening to the resultant resonance, when he noticed the sound around him change, he turned on his torch. At these locations of unique acoustics he often saw a painting or marking on the wall or ceiling of the cave. The markings could be as simple as a single red dot or as complex as a pattern of lines, negative handprint, or an animal. What Reznikoff found was

that in locations where the cave sounded most “interesting,” he was most likely to find the greatest concentration of prehistoric art (Hendy, 2014). These findings reveal a form of technologically mediated sound dating back to the middle and upper Palaeolithic periods, between 20,000 to 40,000 years ago (Hendy, 2014). Perhaps Neanderthals of this period found themselves in a mental state similar to that of the contemporary human walking down an empty hallway or subway platform, and their resonance discoveries may have been a result of these vocalizations? Maybe they too were trying to break that moment of uncomfortable silence?

One must consider the wonder and/or fear experienced by the early human who first stood inside a lightless cave and heard his own voice reflected back in an unusual manner, and what his companions would likely have thought. Would they believe him to possess the power to make spaces speak? Would this individual become a religious figure within his clan? Would this newfound “ability” elevate his status to shamanistic stature? These unusual sounds surely would have seemed supernatural, and an individual of elevated status could use these otherworldly sounds as significant elements of a ritual or ceremony. “Sound as the means of accessing a spiritual or divine world has also been a remarkably pervasive feature of human culture” (Hendy, 2014).

In Wiltshire, England stands Stonehenge, a monument built between 3,000 BC to 2,000 BC and perhaps one of the best pieces of evidence for acoustic design in the prehistoric world. “While the outer sides of its stones are rough and relatively unfinished, the inner faces are much smoother and lightly concave” (Goldsmith, 2012:19). “The effect of this is to make the space inside Stonehenge nearly as reverberant as a concert hall, with a reverberation time of just over a second. When it was complete, Stonehenge must have been an ideal acoustic space, working so

that a speaker's voice filled all parts of it to a similar volume" (ibid:20). The fact that the stones of the structure are aligned to the sunset of winter solstice and sunrise of summer solstice leads us to believe that it was built and used for ceremony and ritual coinciding with the lunar cycle, times of significance to ancient and contemporary humans alike. The acoustic design likely suggests that individuals of significance would have used their position within the structure as a point of oratory to be heard by a group of listeners and followers of a prehistoric belief system. The resonance provided could have functioned as a prehistoric public address system for the delivery of speeches or sermons.

Whether fact or myth, the story of the *Alleluja Victory* affirms my belief in the power of sound when mediated by resonance. Constantius' *Life of Germanus*, written around 480 AD, tells of a battle between the Britons and the invading Picts and Saxons. Led by St. Germanus, the Briton army used their voices alone to defeat the enemy. "...while the enemy were still in the belief that their approach was unexpected, the bishops three times chanted the Alleluja. All, as one man, repeated it and the shout they raised rang through the air and was repeated many times in the confined space between the mountains" (Jones, 1986:364). Clearly a case of accidental victory aided by resonance, it nevertheless presents a case of mediated sound creating an outcome that would have been very different without the mediation. "The enemy were panic-stricken, thinking that the surrounding rocks and the very sky itself were falling on them. Such was their terror that no effort of their feet seemed enough to save them. They fled in every direction, throwing away their weapons and thankful if they could save at least their skins" (ibid). Much like the cave resonance, the bishops' chanting of Alleluja producing what would have been perceived as a supernatural sound, made the listeners believe that they were

either outnumbered or that the enemy had the power of God on their side. Whether or not this story is accurate, and there is much dispute, I argue that the value of it within this context lies in the power of technologically mediated sound to project a message that is far more potent than it would have been if unmediated.

One could relate these stories of mass communication in antiquity to media of today, in that the use of technology to disseminate a message bestows great power on the message, and its orator; because due to technological mediation there is the power for a singular message to reach a mass audience. Unlike oral culture of its time, in which one message was passed between a few individuals, the prehistoric use of resonance as technologically mediated sound empowers an individual, or small group of individuals, to project a single message to a large and captive audience. When mysticism, religiosity, and power are elements of the message delivery system, the balance of power becomes lopsided; the recipients are in awe, or fear, of the perceived powers of the “information outlet” and perhaps the perceived repercussions of non-compliance or inattentiveness. Such repercussions could take the form of social ostracism or lack of favour with the shaman or gods, and could guilt or scare individuals into being part of the compliant flock. Resonance, as presented in the preceding section, is the first example of an early technologically mediated sound that has the power to communicate a singular message to a mass audience

Flutes, Horns, and Bells

Almost all cultures seem to have employed some type of horn in association with warfare and the hunt. The Romans used a hooped horn of conical tubes as a signalling instrument for their armies.

(Schafer, 1977)

Flutes

Sound can impose its power upon the ear in several ways, the easiest of which is sheer dynamic volume. To the palaeolithic ear, any unusual sound produced by another individual would likely have been perceived as either threatening or supernatural, or both. When the sound is produced with the aid of an animal bone, the significance of the sound and the individual producing it can take on a new dimension. The “audience” and “performer” may have believed the sound production to be a sort of communion with the natural world (Neal, 2013). Palaeolithic flutes that have been found at European⁴ archaeological sites that date back as far as 40,000 years ago could be another example of early human use of technology to mediate sound and perhaps, resultantly, establishing hierarchical structures within community. “In shamanic practice, the instruments were capable of symbolically transforming the player into a bird or other animal species, enabling the shamanic flight or journey” (Neal, 2013:2). The perception for the listener would likely be that the performer has a special connection to the animal realm, and they would likely believe that he is able to communicate with animals and perhaps even have agency over the natural world. “As the shaman becomes the bird or animal, a state of unity and identification with the natural world is established. The player thus merges with the natural world, achieving union with his environment” (ibid:2). One can easily see how this belief could

⁴ Archaeological sites in Germany and Slovenia have produced the oldest samples of bone flutes, although less ancient specimens have been discovered in Italy, France, and England (Lawergren, 1983).

quickly expand into one in which the performer can affect the change of night to day, sunshine to rain, warm summer to cold winter. Something as simple as a bone flute could have the potential to bestow a prophetic or messianic identity to the one who possesses it and his words could be perceived as coming directly from the earth or the heavens.

These bone flutes are believed to have been constructed from bird bone, while some more elaborate and older flutes appear to be made of ivory from a mammoth. In addition to shamanistic ritual these instruments may have functioned as a means of masking the voice of the user. Depending on the meaning or significance of the flute, which may have been signified by its shape and physical markings and decorations, some bone flutes may have been used for non-verbal communication and early music making; “The flutes communicated symbolically as well as musically” (Neal, 2013). In addition, or perhaps subsequently, to their use as shamanistic ritual devices, bone flutes likely functioned as social instruments for animating stories, creating environmental or melodic sounds, and social gatherings. When these devices, that were once considered only for those of elevated status, made their way into the hands of the general population, they perhaps lost some of their mystical power, thus democratizing sound and music creation.

Horns

So the people shouted when *the priests* blew with the trumpets; and it came to pass, when the people heard the sound of the trumpet, and the people shouted with a great shout, that the wall fell down flat, so that the people went up into the city, every man straight before him, and they took the city

(The Book of Joshua, 6:20)

My thirteen-year-old son plays trumpet and violin, both at an intermediate level. He plays trumpet in The Hamilton All Star Jazz Band and violin in The Hamilton Philharmonic Youth Orchestra. His practice area is the space in front of the upright piano in our dining room, which is openly connected to both the living room and kitchen. Although both the trumpet and violin can produce sounds at a loud volume, if a competition were held with my iPhone decibel meter app as the judge, the trumpet would easily be the winner. Trumpets and other brass instruments, colloquially referred to as horns (trombone, cornet, bugle), are typically thought of as loud instruments. A search of a pdf version of *The Old Testament* for the word “trumpet” returned 109 results with contexts that included: disaster, war, marking significant events, plague, etc. The most famous example is likely the “Battle of Jericho” from the “Book of Joshua” in which priests marched around the city walls blowing rams’ horns until the sound of the ‘trumpets’ caused the walls of the city to come tumbling down. Another well known example is found in the “Book of Revelations” in which trumpets appear in the form of seven instruments, played by angels, sounding one at a time to cue the apocalypse.

In some cases the mention is of blowing a trumpet, while in others it is referred to as trumpets of rams’ horns. The terms “trumpet” and “ram’s horn” appear to be interchangeable and

likely indicate that these terms are in reference to the shofar.⁵ The shofar is used primarily for religious holidays such as Rosh Hashanah, the New Year, when a “complex call of a hundred calls is performed”; and Yom Kippur, the Day of Atonement, when “a single shofar blast at nightfall signals the end of the fast day” (Chase, Marin, Marks, Schonfield, Watson, 2009).

While its contemporary function is one of signalling simple temporal demarcation points within religious observance, its numerous mentions in *The Old Testament* are of unique, significant moments and events. Most of these events involve a call to action or attention, and the power of the trumpet is frequently mentioned in the form of events of great volume including “sounding an alarm” (Numbers, 10:1); and the sound of the trumpet is said to be “loud” (Exodus, 19:19) and its sound causes people to “tremble” (Exodus, 19:16). In *The Old Testament*, the shofar trumpet holds a position of authority and command over the population, and its sound is said to have a visceral effect on those who hear it. My wife would attest to this power on the days when my son is practising scales, arpeggios, and lip flexibility exercises that happen to temporally coincide with her need to make business calls from home or when she has a headache.

The trumpet as a symbol of power and stature is prevalent throughout history and across geography. In a 1922 excavation of the tomb of ninth century B.C. Egyptian pharaoh Tutankhamun, archaeologists found two trumpets, one bronze and one silver. These trumpets are believed to have been used in military operations of Egypt’s newly formed standing army that became necessary due to frequent attacks from neighbouring peoples. The trumpets are thought to have been used as sonic signifiers by providing “clearly audible signals” used for “precision of movement” of military personnel (Kirby, 1947). Similar to some of the biblical mentions of

⁵ The shofar is an ancient Jewish ritual musical instrument made from a ram’s horn.

trumpets, the ancient Egyptian trumpets were also symbols of military power and hierarchy. Another ancient example of the trumpet as an instrument of power is in Norse mythology. Heimdall, the watchman of the gods, was believed to sound the *Gjallarhorn*, the “ringing horn,” and it could be “heard throughout heaven, earth, and the lower world; it was believed that he would sound the horn to summon the gods when their enemies, the giants, drew near at the *Ragnarök*, the end of the world of gods and men” (Heimdall, Britannica, 2018). The similarities between historical records of trumpet use and those from myth and legend are striking, many of which connect the trumpet with warfare and military pursuits. This is entirely appropriate as the trumpet is arguably one of the loudest of all instruments, particularly when one considers the higher frequency range of the trumpet compared to the trombone and the ability of the higher frequencies to be audible at greater distances.

The trumpet as represented by historical, biblical, and mythological texts is a technology of power and dominance as it is used to signal the danger of enemy attack, direction for the movements of military troops, and the end of the world. Whether the preceding examples are based in fact or fiction, I argue that the meaning of the instrument’s power is not in the believability of the story but in the conviction of the author and readers to reach agreement on as much. I argue that whether I witness the trumpet played to signal a moment of silence on Remembrance Day or I read the story of *Gjallarhorn* calling the Norse gods to an apocalyptic battle, the power of the trumpet is in the idea and identity of the instrument. The trumpet does not appear to be an instrument or technology of community, concerning connecting and bonding, or one of presence, as will be described with reference to sound mediating technologies discussed later in this section. Rather it is a technology of power.

Bells

When I think of a bell, many memories and iterations of it come to mind; I think of a doorbell announcing the arrival of a visitor, expected or unexpected, wanted or unwanted, familiar or strange, “trick or treating” on Halloween night, a school bell signalling the end of one class and the beginning of another, lunchtime, beginning of the (first) school day (of the year), end of the (last) school day (of the year), fire drill in grade six when we had to stand outside in the freezing cold for 20 minutes; my reluctant self ringing a hotel reception bell that was tucked behind a note that read “ring bell for service,” the bell signalling that it was time for the assembly line to move to the next station at the *Glendale Recreational Vehicles* factory where I worked in my late teens as an assembly line worker. Although I have a similar range and variety of feelings when I think of the flute and trumpet, these feelings are a result of these instruments functioning as musical instruments and not as signifiers of an encapsulated message about time demarcation, warning, arrival and departure. Embedded within all of these messages, delivered via the sound of the bell, is a plethora of potential emotional reactions and repercussions depending on the specific meaning behind the sound of the bell; i.e., is the visitor a friend with whom you want to spend some time or a stranger trying to sell you a service contract from a questionable hydro service provider?

The sounds of bells as characterized by the preceding examples from my personal experience represent power, social structure, and the observance of extrinsically imposed temporal routine, the meanings of which can be either positive or negative depending upon expectation and outcome. I argue that the doorbell, as a technological extension of the action of the door knock, represents, for the listener, the yin and yang of danger and opportunity and the

other examples of bells represent versions of the same. For the most part, the bell exerts power upon the listener(s) for whom its sound is intended, as the sound of the bell typically signals to the listener that it is now time to do something different from what they had been doing: i.e., French class is over, and it is time to move to Science class; a customer has walked in the shop door and may require attention from the shopkeeper; someone is at the front door. All of the aforementioned scenarios depict relationships of power in which one individual, or group, is at the behest of another individual, group, or organizational system. This sort of power concerning bells and, in particular, Christian church bells will be further discussed in this section.

The traditional western conception of the bell is one likely most commonly associated with religion, more specifically, Christianity. The Sunday morning church bells that I have heard for as long as I can remember, in towns and cities throughout North America, have always seemed to be representations of community and tradition. As I have explored the phenomenon of church bells more thoughtfully, it has become clear that although community and tradition are likely the desired end result, it is also clear that church bells are sound mediating technologies of power. Some of the earliest uses of bells were religious-based sonic representations of social distinction and hierarchy, as in the act of attaching bells to the robes of priests. “And they made bells of pure gold, and put the bells between the pomegranates upon the hem of the robe, round about between the pomegranates; A bell and a pomegranate, a bell and a pomegranate, round about the hem of the robe to minister *in; as the Lord commanded to Moses*” (Exodus 39:25-26). This act of sonic signification projects status through sound-making as the wearer of the bells has the distinction of being a holy man, presumably in good favour with God. Also, bells would be, and are still, worn by livestock to “guard against evil spirits, frighten away predators, and hold a

flock together by its distinctive sound” (Price, Percival, Bodman Rae, and Blades. 2001). This utilitarian use of sound technology expresses power with regard to the threat of both evil spirits and predators, and the power of possession concerning the flock being owned by an individual.

My experience of both small towns and large metropolitan cities in North America and Western Europe is that each will, without notable exception, have a church in or near the centre of the town or city. The late nineteenth-century Neo-Gothic style St. Patricks Cathedral in New York City is located on 5th Avenue, steps from the media “mecca” that is Rockefeller Plaza. Cathédrale Notre-Dame de Paris is located on île de la Cité (Island of the City) on the Seine river and nestled between the East and West Bank in the centre of Paris. In my childhood town of Strathroy, Ontario, on each Sunday morning, I could clearly hear the church bells of St. Andrew’s Presbyterian Church. “If bells oriented Christians in time, they also oriented them in space. Churches often were situated at the centre of their parishes, uniting all those within earshot. If one could no longer hear the bells, then one had moved beyond its geographic boundaries” (Weiner, 2014). This example of the bell as sound mediating technology is one that I would argue represents both power, presence and acoustic community.

The power exerted by the church bells could be compared to the school bell marking the beginning, end, or period changes of the academic day; the bell signalling movement of the factory assembly line; or the hotel lobby reception bell calling the hotel employee to service the needs of those at the reception counter. The sound of the church bell signifies power in the form of a hierarchical expectation of religious obedience in adherence to the rules of church worship. There was also a hierarchical power structure among churches concerning the sound of bells as described by Mike Goldsmith; “In Catholic countries, bell-sounding was highly regulated: parish

church bells were obliged to be silent until the most senior church in the region had been rung. Monasteries, no matter how large, had only a single bell to emphasize their humility, and in 1590 the Council of Toulouse ruled that monastery bells must not be so loud as to drown parish church bells” (2012). The production of thunderous sounds with immunity from complaints about noise and public disturbance demonstrates the power held by churches. If McDonald’s decided to use loudspeakers, or even bells, to play their “I’m loving it” melody to announce a weekly promotion, it would surely be met with opposition from a wide variety of community groups. Perhaps this is not a fair comparison, but one religious sound does not fit all, yet all are subject to its sound. I argue that the imposition of a sonic signifier upon those who do not subscribe to the ideology associated with it makes the church bell a sound of power. The sound of the church bell functions as a call to action, a sound, believed by the devout to be, embedded with sacred power. The action demanded by the beckoning of the sacred bells was that followers of the version of Christianity associated with the building generating the bell-ringing, go to their building of worship and congregate for the Sunday sermon delivered by a priest or minister. The power of the bell to create a congregation of individuals seeking blessing or healing is evidence of its ability to instantiate presence in the form of the building of an “acoustic community” (Schafer, 2006).

When people listened attentively to his sermons, they were hearing the word of God. Naturally, what he talked about mattered a great deal, He would have important things to say about scripture, behaviour and morality that needed to be heard. However, just as the ringing of church bells had a sacred power, the very sound of the priest’s words also had force. It was as if an entire congregation were receiving a blessing and might be cured of their ills if they let his words seep in.
(Hendy, 2014)

The congregation described by David Hendy is what Schafer and Truax refer to as “acoustic community.” Schafer says that “community can be defined in many ways: as political, geographical, religious or social entity” and he goes on to say that “A parish was also acoustic, and it was defined by the range of the church bells. When you could no longer hear the church bells, you had left the parish” (Schafer, 2006). In this way, the church bells exert not only the power to demand religious obedience but also the power to designate neighbourhood and community environs: sound as place-maker. “The church parish has traditionally been defined in relation to the acoustic profile of its bells” (Truax, 1984). The social feedback of this sound technology is that in bringing individuals together for the purpose of blessing or healing, the bell is responsible for creating community. The sound of the church bell could, for the parishioner, be imbued with the feeling of healing, blessing, and the sense of being part of something greater than himself: community. In this way, the bell is a sound mediating technology of presence and acoustic community. The sound of the bell brings individuals together to form a community with a shared set of beliefs and values, participating in the act of religious worship.

Today these bells are mostly symbolic as they are no longer necessary for time demarcation as smartphone calendar reminders do that for us now, or as a sonic signifier of geographic location as google maps and smartphone location services functions take care of that. The sound of church bells today, particularly in an urban setting, almost seem out place, like a juxtaposition of modernity and antiquity. Within the context of a busy North American city, the sonic power of the church bell is all but lost among the urban din of modern city life. For those who are able to hear its sound, it could function as a sort of sonic time machine, inviting the listener to imagine what their current location may have looked like when the sounding church

bell was installed. In doing so, perhaps the *presence* of the church bell is not lost when its historical sound is contrasted with that of modernity. The contemporary and “aurally awake” urban pedestrian may bring their awareness to the historical function of the bell, and in doing so they also initiated a form of presence. They bring this consciousness to a different time and place, thus bringing them mentally closer to those for whom the bell originally tolled.

Knowledge of drums being used in the hunt to frighten animals in the direction of awaiting hunters (Lawergren, 1988) or forms of the bull roarer as ritual sound maker being used around the world and throughout history (Marcuzzi, 2010) tells us that our ancestors have been using technologically-mediated sound for thousands of years and for a variety of functions. The examples of technologically-mediated sound that I describe in this section differ from the drum and bull roarer in that the examples that I discuss are specifically related to the ways in which these mediated listening experiences affect our relationships with one another and, in some instances, the ways in which these technologies can create hierarchies of power and authority. Throughout this process, I am acutely cognizant of the parallels between these early models of power structures through sound communication and the contemporary examples of similar relationships that exist between the delivery and reception of information, whether in the form of sound, visuals, or text. Just as with the cave resonance and the bone flute, the individual(s) with access to the technology are bestowed with a significance that has the power to elevate them to a status of prophet. Contemporary examples of the person with “access to the technology” abound, and one need only look at political campaigns and associated scandals, whether in recent years or in decades past. With the existence of public sounds such as church bells, arises the question of

noise in public (Weiner, 2014) that will be discussed later in this chapter as part of a discussion about the Islamic call to prayer and related noise abatement and standardization movements.

Stethoscope

In the 1750s, inside the wine cellar of a hotel in Graz in Austria, the young Leopold Auenbrugger had regularly watched his father tapping wine casks to work out how full they were. A decade later when Auenbrugger had qualified as a doctor in Vienna, he decided the same effect might be found with people. He realized that if he placed his hands on a patient's chest, tapped with one finger, then felt for the resulting vibrations – while perhaps also pressing his head against the patient's chest to listen – he could work out whether it was healthily full of air or dangerously flooded with liquid. (Hendy, 2014)

The practice of mediate auscultation (Krebs and Van Drie, 2014), listening to the body's inner organs, was surely an advance in medical practice in the eighteenth century, but it still presented challenges. Even though the sounds inside the patient's body could be heard, they were still very faint. “And perhaps more seriously, in the 1750s, pressing your ear against someone's chest, even if you were a thoroughly respectable doctor, was a rather unseemly thing to do” (Hendy, 2014).

The need for the preservation of the patient's privacy and respect for personal space was a concern that needed to be addressed. In 1816, a young French physician named René Laenec, after having observed school children playing with long hollowed-out sticks rolled up a sheaf of paper into a cylinder and put one end against the patient's chest and his ear to the other (ibid).

“Through this makeshift instrument he heard more distinct sounds of the action of the heart than he had ever heard before” (Reiser, 1979). At this moment the stethoscope was born, at least in its first iteration. This simple sound mediation tool initiated a “profound transformation in the

practice of medicine," and the eventual acceptance of the stethoscope by the medical community "led to the establishment of the physical examination as the keystone of diagnosis" (ibid).

Before the aid of the stethoscope, physicians would most commonly diagnose a patient's condition based on their own observations of skin colour, tongue condition and breathing (ibid), without the aid of any technology. Although Auenbrugger's technique of auscultation was commonly used, it provided faint information to aid in diagnosis. The rolled up sheaf of paper evolved to become a monaural hollowed-out piece of wood, and eventually the flexible binaural stethoscope made of rubber, plastic and metal (ibid) that we recognize today. The invention of the stethoscope was a leap forward in medical technology, but it still required physicians to recognize the new world of internal sounds that this technology brought to their attention.

Doctors could now make authoritative diagnoses "sometimes exclusively—on the basis of aural information" (ibid). I argue that the stethoscope represents both power and presence in that the aural information provided by this sound mediating technology provides doctors with a great deal more information for assessing and diagnosing a patient's condition, while at the same time bringing the physician's presence of aurality deep inside the body of another human being. This newfound technology made it necessary for doctors to listen to not only what their patient was saying but also what their patient's body was saying. The stethoscope, in addition to the practice of auscultation, "made it clear that the body, too, has a soundscape of its own" (Rice, 2012). The stethoscope is a technology that at once empowers both doctor and patient with regard to ascertaining the current state of the patient's health, while at the same time creating a state of presence for both; the doctor instructs the patient to breathe deeply, hold their breath, breathe normally, while the doctor pays close attention to the minute details of the patient's bodily

workings. The patient is experiencing presence as they are consciously enacting autonomic functions of which they are typically mostly unaware, while the doctor is present in keenly focusing on their patient's inner workings. One could argue that the physician - patient relationship during a stethoscope-aided examination is the most intimate human connection possible; one person listening deeply into the body of another.

Sound Recording

Like Prometheus, urban man “stole” noise from the gods, and ever since, the most powerful institutions have produced the most powerful sounds.

(Truax, 1984)

At 11:40 pm on December 31, 2016, I was sitting with my family in the dying minutes of another year having past. We were huddled around the television, watching *Dick Clark's New Year's Rockin' Eve* live from Times Square in New York City where Mariah Carey was emerging from behind a shroud of enormous white feather fans being held and fluttered by a troupe of male backup dancers. As she began to sing “Auld lang syne” something seemed a bit off.

When Mariah Carey released her self-titled debut album in 1990 I, like most who listened to North American pop radio at the time, was amazed by the clarity and precision of her singing voice. What I had just heard, as she began to sing on New Year's Eve, 2016 was far different. Not only did her voice appear to lack the power and clarity of her younger self, understandably so, but the sound and image almost appeared to be out of sync. As her performance continued, she moved on to “Emotions,” the title track from her 1991 album, but something seemed to be going wrong with the performance. She was not singing, but her singing voice could be heard. She was, instead, telling the dancers to walk her down the stairs. She then began to speak directly

to the audience remarking “We didn’t have a check for this song, so we’ll just sing. It went to number one. We’re missing some of the vocals, but it is what it is” (Izadi, 2017). One of my family members in the living room that night described the experience of watching the broadcast of the live performance like “watching a car crash in slow motion.” Perhaps Mariah Carey’s disastrous performance was an appropriate end to 2016, a year that brought the Donald Trump U.S. presidential election victory. The newly elected U.S. president would go on to make a great deal of noise, both sonic and visual, in the form of *Twitter* posts, further asserting the supremacy of the communication and distribution of a message; delivered from a privileged few to a mass audience. Whether the audience subscribes to the ideology of the message or not, they are subjected to it, as the words of the privileged few have the power to permeate most regions of physical and psychic space.

I argue that Mariah Carey’s *New Year’s Rockin’ Eve* performance was riddled with not only technical issues but also issues of performer-audience expectation. Typically, when a group of people gather to watch a musical performance, there is an expectation on the part of the audience members that they will be watching said performer singing, playing musical instruments, and presumably moving about on stage. The expectation on the part of the performer(s) is that the audience chose to be in this place and will, in turn, show their gratitude toward the performer(s) for their stage performance. However, what if the performer does not perform at a level that is acceptable to the audience? What if the performer does not perform, but instead mimics the performance while a musical track plays in the background? This is in fact what was happening at the Mariah Carey performance, but this is not why the performance was a disaster. The trouble arose when she drew the audience’s attention to the technical problem, at

which point everyone became acutely aware that a pre-recorded vocal track was being played for her performance. If there had been no technical issues and Ms. Carey had been able to lip sync to the pre-recorded track, there would have been nothing to talk or write about the following day. Her performance would have been as expected: a singer pretending to sing her song in front of an appreciative audience, many of whom presumably know that she is not singing.

On November 4, 2008, Barack Obama was elected President of the United States of America. Just over two months later, on January 20, 2009, his inauguration was a momentous occasion with a musical line-up to rival most music festivals. Performers included Beyoncé, Bruce Springsteen, Pete Seeger, U2, James Taylor, and Stevie Wonder, to name a few. Perhaps the most talked about performance was not by pop stars, but by classical musicians.

A chamber ensemble comprised of Yo-Yo Ma, Anthony McGill, Gabriela Monterao, and Itzhak Perlman performed a new piece composed for the inauguration by film composer John Williams. However, what crowds of attendees on the Mall in Washington D.C. and millions watching on television “heard was, in fact, a recording, made two days earlier by the quartet and matched tone for tone by the musicians playing along” (Higgins, 2009). Perhaps we have become accustomed to wondering whether the performers we are watching on television awards shows are “actually singing,” but we fully expect that the classical musicians we are watching are producing the sounds we are hearing at the time we are hearing them. The power held and exercised in this and other lip syncing, or play syncing in this case, performances is firmly in the hands of the production team responsible for the performance event. In the case of the Obama inauguration performance, “the players and the inauguration organizing committee said the arrangement was necessary because of the extreme cold and wind during Tuesday’s ceremony.

The conditions raised the possibility of broken piano strings, cracked instruments and wacky intonation minutes before the president's swearing in..." They went on to say that "No one's trying to fool anybody. This isn't a matter of Milli Vanilli" (Walkin, 2009). Whatever the motivation, those with the power to decide what the audience would hear intentionally deceived them by having the musicians mimic the performance rather than produce the music in situ. Perhaps this particular story is not so far removed from the "slight of hand" experienced by those who heard the first ever recorded sound?

When Thomas Edison patented his phonograph invention on December 19, 1877, he could never have imagined the eventual Mariah Carey or Obama inauguration uses of future iterations of his invention. He did, however, recognize the power inherent in the invention when he said "We will be able to preserve and hear again, one year or one century later, a memorable speech, a worthy tribute, a famous singer, etc. We could use it in a more private manner: to preserve religiously the last words of a dying man, the voice of one who has died, of a distant parent, a lover, a mistress" (Attali, 2014). The phonograph would later be used to record and replay the voices of leaders, "as an archival apparatus for exemplary words, a channelization of the discourse of power, a recording representation of the boss' orders" (ibid). "The phonograph was thus conceived as a privileged vector for the dominant speech, as a tool reinforcing representative power and the entirety of its logic" (ibid).

On September 11, 2001, "many of those trapped in the towers or on the planes – people who often knew they were about to die – left messages on the telephone answering machines of their loved ones. There was the message from a man on one of the hijacked planes to his wife. 'I want you to be happy, I want you to carry on,' he said. "See you when you get here." Another

from a New York firefighter who called his wife and left a message saying, “I don’t know if we’ll make it out. I want to tell you that I love you and I love the kids.” In the first year after his death his wife, Veronica, played the recording to herself hundreds of times. She said “he was thinking about us in those final moments. That gives me great comfort” (Hendy, 2014). This, and many other examples of such recordings that we heard in the days and weeks following what has come to be known simply as “911,” viscerally demonstrate Edison’s idea of sound preservation. The utilization of the phonograph to “preserve the words of a dying man” is, in my opinion, a clear example of a sound mediating technology of presence; the act of friends and family members having the opportunity to hear the voice of a loved one who has died has the power to bring them closer to someone with whom they can never be again, and in turn has the potential to bring those in the presence of the recording to reminisce about the departed and enact a sense of community and presence. However, as is the case with any new technology, only the privileged few with financial means initially had the opportunity to experience this presence, making sound recording also a technology of power.

Microphone & Amplification

The amplified voice, whether it is that of the advertiser, politician, demagogue, or simply that of the speaker who has the floor, carries with it an authority unattainable by the unaided voice. (Truax, 1984)

Well I have a microphone and you don't, so you will listen to every damn word I have to say!
(Adam Sandler, *The Wedding Singer*, 1998)

At the inauguration of Barack Obama, or more recently that of Donald Trump, microphone and amplification were technologies used to project a single message to a mass audience. This model is a clear example of sound technology in the hands of those with power, but how would an individual or group without this sort of power make their thoughts known to a mass audience? The microphone, megaphone, and other forms of amplification of the human voice are common technologies in settings where a group meets to demonstrate or protest. However, in some situations, it is necessary to have a permit issued by a government office before one can use “amplified sound” of any kind. The “people’s microphone” is one way to circumvent this obstacle. The “people’s microphone” or “human microphone” is enacted by a group leader uttering a phrase, which is then repeated in unison by the group of people standing closest to the speaker and able to hear what was said, thus allowing the speaker’s words to be heard by a large audience in a setting where a single un-amplified voice could not otherwise be heard. This form of mass communication requires cooperation and compliance. I argue that in some ways it not only resembles and can be compared to what has come to be known as *the social media echo chamber*⁶ but also exhibits clear parallels with the use of the microphone at the presidential

⁶ a situation in which a group of like-minded individuals have their existing beliefs reinforced and amplified as a result of a repeated message that embodies an already accepted ideology.

inaugurations cited earlier. Although the protest or demonstration is typically an expression of dissatisfaction with power, the use of the people's microphone, or any other hierarchical ideological structure for the dissemination of ideas, is a real manifestation of an imbalance of power where one, or a few, individual(s) speak on behalf of a larger group in protest to a situation in which the few in power speak for a large group. In addition, I would argue that the act of repetition by the large group closest to the speaker is thoughtless repetition, without a moment to assess the statement and decide whether or not the individual member of the large "echo group" fully agrees with it and is committed to the ideology embodied within it. All that being said, I still believe that the "people's microphone" is a far more democratic public address system than the technologically-mediated sort requiring a microphone and electronic amplification.

The sound of church bells on Sunday, a factory whistle signalling the end of the workday, and the Islamic call to prayer are examples of sonic signifiers that create acoustic community. "The fact that everyone within that area can hear the same sound provides the basis of a sense of community for those people" (Truax, 1984). Barry Truax defines acoustic community as "any soundscape in which acoustic information plays a pervasive role in the lives of the inhabitants" (1984). An acoustic community is one in which sounds provide cues or instructions that allow community members to remain engaged with the community at large; "sound plays a significant role in defining the community spatially, temporally in terms of daily and seasonal cycles, as well as socially and culturally in terms of shared activities, rituals, and dominant institutions. The community is linked by its sounds. To an outsider, the sounds may appear exotic or go unnoticed, but to the inhabitants, they convert useful information about both individual and

community life” (Truax, 1984). I argue that nowhere is this characterization of acoustic community more epitomized than in the Islamic community and the sound that creates the acoustic community is the call to prayer. In the section that follows I provide a discussion of the Islamic call to prayer and the technologically-mediated modernizations and standardizations that have taken place over the past century, with Turkey and Egypt as specific examples of different approaches to these changes. Research into the Islamic call to prayer was the initial point of entry for me into the exploration of sound, technology, and experience and has been a kind of touchstone for much of this research project.

Technologizing the Sound of Religious Tradition

It is the summer of 2010. Under the mid-afternoon sun, the urban din of the historic district of Istanbul is overpowered by the sound of *ezan* (Islamic call to prayer) projected from loudspeakers high atop the minaret of Sultan Ahmed Mosque. This call to prayer is being performed by a *muezzin* seated in front of a microphone inside the mosque. Most of the city appears to go about its business with the exception of a flow of predominantly men, who make their way toward the entrance of the 17th-century mosque. As the sound of *ezan* continues to emanate from Sultan Ahmed, another *ezan* comes from the nearby Mehmet Pasha Mosque. Moments later another *muezzin*’s voice is heard from the direction of Nuruosmaniye Mosque. The *muezzins* almost seem to recite in response to one another. My experience at this moment is only possible due to technological intervention, or the *technologizing* of the call to prayer. This moment and another experience described in Chapter One, although I did not know it at the time, would inspire and eventually shape my dissertation project.

In this section I will discuss various forms of standardized *ezan*, which are only possible because of sound mediating technologies, and have the potential to transform the aesthetic of the tradition. The evolving and often contentious relationship between technology and Islam will be addressed in order to contextualize recent modernizations within a broader historical timeline. In this section, special attention is paid to the Turkish *ezan*, with examples provided based on my fieldwork in Turkey, particularly Istanbul, with the intention of gaining a deeper understanding of the pervasiveness and relevance of an ancient sonic tradition within a modern day city.

How technology is changing the Islamic Call to Prayer

The Islamic call to prayer is a 1400-year-old tradition that has arguably remained virtually unchanged, until recently. A beacon for Muslim prayer, this melodic proclamation of faith is the same in its text and religious function as when Muslims believe it was heard for the first time by the Prophet Muhammad. Decisions by the Egyptian Ministry of Religious Endowment, and a prominent Turkish *Mufti* (scholar/interpreter of Islamic law) to standardize *ezan* have, in their respective manners, changed a tradition that has existed since the 7th century AD. In the case of Cairo, the decision was made to standardize the *ezan* by changing the method of performance from one that in the past saw as many as 827 *muezzins* (reciters of *ezan*) performing the call to prayer at different mosques across the city. The mandate, instituted at the start of *Ramadan* (Islamic month of prayer and fasting) in August of 2010, has the *ezan* being recorded at radio Cairo by a single muezzin. The recitation is then broadcast to mosques and prayer halls across the city. Thirty muezzins, deemed the best in Cairo by the government ministry, were selected as the official muezzins to alternate performance of the *ezan*. The official plan by the Egyptian

government was soon instituted in other major cities in Egypt, and eventually throughout the entire country. Although muezzins at official government recognized mosques would continue to earn their salary and carry out their other duties as stewards of their respective mosques, and perform ezan for Friday *namaz* (prayer), their role and function, one that has remained virtually unchanged for more than a thousand years, was now evolving (*The National*, 2010).

In the Spring of 2010, muezzins in various neighbourhoods of Istanbul began holding official meetings with some regularity in order to improve their performance techniques. Learning from more experienced muezzins, and in some cases Turkish pop singers, the muezzins take group and individual lessons in order to acquire the melodic performance skill necessary to perform the ezan at a level that will be acceptable to religious scholars and the general public (Sandels, 2010). The standardization in Istanbul, although less radical, has the potential to create a homogeneity of *ezan* practice that could produce similar results to that of the recent modernization in Cairo. I will argue that standardizations in Turkey and Egypt are politically motivated, and not merely noise abatement initiatives as suggested by officials in both countries. I will further argue that these modernizations are highly contentious, not only for older Muslims, but, and possibly even more so, for younger Muslims with a newfound yearning to understand their cultural lineage amid protests, civil war, and widespread political unrest and uprisings in their respective nations.

Ezan

Ezan is said to have been performed for the first time between 622 and 624 A.D., at the behest of the Prophet Muhammad. After a trusted companion recounted a dream in which a single voice called all Muslims to prayer, the Prophet decreed that the message of his companion's dream was to be actualized as a means of distinguishing Islamic prayer times from that of other religions being practised in Medina at the time. Bilal ibn Rabah is believed to have been the first *Muezzin*. Chosen for his beautiful singing voice, Bilal, who was once a slave, was born in Ethiopia and was one of the first converts to Islam, and a loyal companion of the Prophet Muhammad. Muslims now had their own *call to prayer*, with a function identical to that of the Christian church bells or Jewish Shofar. Below is a translation of the *ezan* text.

Allāh ^u akbar (4x)	God is most great
Ashhadu an lā ilāh ^a illa 'llāh (2x)	I testify that there is no god besides Allāh.
Ashhadu annaMuḥammad anrasūlAllāh (2x)	I testify that Muḥammed is the apostle of Allāh.
Ḥayya 'ala 'l-ṣalāt (2x)	Come to prayer!
Ḥayya 'ala 'l-falāḥ (2x)	Come to salvation!
al-Salāt khayrun min al-nawm	Prayer is better than sleep [only included in pre-dawn ezan]
Allāh ^u akbar (2x)	God is most great.
Lā ilāh ^a illa 'llāh	There is no god besides Allāh.

Ezan is heard five times each day throughout the Islamic world as a reminder for Muslims to take time for prayer. With a pervasive quality and regularity that permeates the daily life of every Muslim and non-Muslim alike, the *ezan* is undoubtedly the most palpable symbol of Islam. Although an essential part of Muslim life, the *ezan* has become an annoyance to some due to the method of broadcast and, in many cases, the quality of performance. Traditionally performed by a highly skilled practitioner of Qur'anic melodic recitation called a *Muezzin*, the

ezan was at one time performed from an internal platform high atop the minaret of a mosque. Today the call is more likely to be performed from a platform or room within the mosque. With the aid of a microphone and electronic amplification, modern *ezan* is projected from loudspeakers attached to the top of minarets. Before the aid of electronic amplification, the geographic area throughout which a *Muezzin*'s voice could be heard when reciting the *ezan* would determine a neighbourhood's boundaries. This simple form of designating community environs was lost with the advent and eventual widespread use of radios and motor vehicles. Amplified *ezan* became the only way for the devout to hear the holy reminder. This is a compelling example of place-making through sound production and how the meaning of place can be drastically altered with the intervention of technology.

Cairo

With a population in excess of 19 million, greater Cairo is the largest city in the Arab world. Known as the "city of a thousand minarets" due to the number of mosques and prayer halls, (some estimates count them at more than 4000) and the extensive examples of Islamic architecture throughout the city, Cairo is a city steeped in the Islamic tradition. With the population being 80-90% Muslim, Christianity and Judaism are the only other "recognized" religions in Egypt.⁷ Although the legal system is based on western European tradition, and the 2011 interim constitution implemented after the resignation of long-time president Hosni Mubarak includes "freedom of belief and the freedom of practising religious rights" and other

⁷ The Egyptian government mandates that all citizens have "ID cards, which currently require that a person choose either Islam, Christianity, or Judaism, which are the three officially recognized religions in Egypt"(http://www.bahai.org/persecution/egypt/update).

modern ideals, the new constitution states that “any new legislation must implicitly agree with Islamic law.”⁸ In a staunchly traditional society with religion at its core, any modernization with direct implications for religious practice would surely create opposing viewpoints.

While the balance of division on the matter is unclear, it is apparent that the Egyptian government has decided that the move is in the nation’s best interest. In an interview with Sylvia Smith of BBC News, Religious Endowment Minister, Mahmoud Hamdi Zaqzouq, was quoted as saying, “There are loudspeakers that shake the world... Everyone hears them. Every day I receive bitter complaints from people from all walks of life about the loudspeakers. When I ask them to register official complaints, they say they fear others will accuse them of being infidels.”⁹ Although the nature of Cairo residents’ complaints range from the volume of the often distorted loudspeakers to the frequently out of tune performance by *Muezzins*, it would be inaccurate to say that the desire for standardization is unanimous.

The voices of dissent regarding such drastic change to a 1,400-year-old tradition of time-keeping within the daily lives of Muslims are not only of those displeased with breaking tradition but also individuals and groups concerned with the motivation for such a radical modernization. Some Egyptians believe that this move could be another form of government control over the lives of its citizens, while others claim that it is motivated by pressure from western nations. Moderates profess that the decision is a step toward the government controlling Friday prayers in

⁸ After the pro-democracy protests of 2011/201, Egyptian president Hasni Mubarak, who had held office for nearly 30 years, resigned and relinquished power to the Egyptian military. The interim constitution was created soon thereafter (http://www.cabinet.gov.eg/AboutEgypt/ConstitutionalDeclaration_e.pdf).

⁹ Sylvia Smith, “Cairo dilemma over prayer calls,” BBC, April 29, 2005, accessed March 2, 2012, http://news.bbc.co.uk/2/hi/middle_east/4485521.stm.

order “to disseminate a single Friday prayer sermon, approved beforehand by the government.”¹⁰

Religious conservatives were concerned that this move is intended to eventually control the proliferation of small prayer halls that may choose to preach their own, in some cases radical, form of Islam. Among the voices of disapproval guided by their own ideologies and agendas, were those who wished for purely aesthetic reasons that the *ezan* in Cairo could remain as it was. Cairo resident Aya Hassan says that "All the different voices make you feel like everyone is kneeling and praying to Allah at the same time. One voice will seem empty" (Nelson, 2010).

Amid the cacophony of car horns, market shopkeepers and radios is the sound of the call to prayer. Creating punctuation in a chaotic and frenetic overcrowded city environment, the *ezan* is not only a reminder to pray but, perhaps more importantly, a legacy of heritage and tradition. “At least one conservative *Imam* (Islamic leader of worship) in Cairo has argued that *technologising* the call to prayer will start the nation down an ungodly path that will one day terminate with people bowing down before TV sets tuned to pictures of Mecca” (Smith, BBC, 2005).

Istanbul

Istanbul is a city between worlds, straddling Europe and Asia with the Bosphorus Sea as its border. For an Istanbul city dweller, it is not uncommon to live in Asia and work in Europe, or vice versa. A network of suspension bridges and ferry services connect the two continents, allowing people to move with ease between the neighbourhoods of this transcontinental city.

¹⁰ Soraya Sarhaddi Nelson, “In Cairo, An End To The Cacophony Of Calls To Prayer,” NPR, August 5, 2010, accessed March 9, 2012, <http://www.npr.org/templates/story/story.php?storyId=128976431>

Once the capital of the Eastern Roman Empire, Constantinople was conquered in 1453 by Ottoman Sultan Mehmed II “the Conqueror,” when his army waged war on the city and eventually brought it under Ottoman rule. As legend has it, when Sultan Mehmed II first entered the overthrown city he rode his horse to *Hagia Sophia*, a Christian basilica at the time, and ordered an *Imam* to recite the ezan on the site. This was the first *ezan* to be performed in the new city of Istanbul, as it would eventually come to be known, thus claiming the nearly one thousand-year-old basilica as the newest mosque of the empire and a symbol of Ottoman and Muslim victory.

The ezan remained virtually unchanged in Turkey between 1453, the height of the Ottoman supremacy, and the fall of the empire in 1924. The decline and eventual dissolution of the Ottoman Empire saw the creation of the New Turkish Republic with Mustafa Kemal Atatürk as its leader. Atatürk almost immediately initiated a series of drastic reforms intended to modernize Turkey. Using a civil code borrowed from Switzerland, the New Turkish Republic implemented sweeping changes in order to create a new secular republic out of the centuries-old Islamic-based system of government (Herbert 1975:80). As part of a wide range of new laws aimed at moving Turkey away from being a religious state in favour of secular governance, long-standing Ottoman traditions were banned including polygamy and wearing of the *fez*. Arguably the most divisive of the Atatürk modernizations was the outlawing of the Arabic *ezan* in favour of a new Turkish call to prayer. This decision was met with vehement opposition that was likely more intense than that of the opposition to the Egyptian modernization. At the heart of the unrest is the fact that the Qur’an and all Islamic literature is intended to be spoken and performed in the Arabic language in which it was delivered to the Prophet Muhammad. This decision by the

Atatürk-led government was implemented as law in 1932, with the penalty of three-months imprisonment and a fine for performing the Arabic *ezan*. The "*Turkishization*" of *ezan* lasted from 1932 until 1950; 18 years of a single sweeping modernization that was unwelcome by the nation's people, and eventually returned to the 1,400-year-old tradition.

In addition to being known as the "city of a hundred names," Istanbul is also nicknamed the "city of mosques." With some estimates totalling the number of mosques in the city at 3,000, in many cases, an individual could stand in a single location and hear the *ezan* from as many as five different mosques simultaneously. The vast majority of these mosques are not grand structures like Sultan Ahmed Mosque, but much more modest street front mosques that, to the unaccustomed eye, would be nearly indistinguishable from a clothing store or mobile phone retailer. When performed by skillful *muezzins*, this recitation creates a sonic experience that is unparalleled in the urban landscape of the non-Muslim world; however, when the *muezzins* are not skilled, the experience can be a mind-numbing cacophony. In an effort to improve the quality of *ezan* performance, the Turkish Religious Affairs Directorate has in recent years mandated that a central broadcasting system for *ezan* be used, and as of August 2008, it had been adopted in 64 of the 81 provinces, and 320 of the 957 districts throughout Turkey. This standardization is identical to that being implemented in Egypt, with one exception; the standardized broadcast is not being implemented throughout the country's most populated cities. The fact that *muezzins* will still be performing *ezan* in major urban centres makes the Turkish approach to standardization one that is more moderate. The current tradition in Turkey is that large metropolitan centres (Istanbul, Izmir, Ankara) have the *ezan* performed by a *muezzin* assigned to each neighbourhood mosque, while in smaller towns and villages (Çeşme, Rize) a recording of

the ezan is transmitted from a central location to receivers and loudspeakers at all mosques in the area.

The Allure of Ezan

The use of melodic pronouncement for Qur’anic recitation and ezan is a method of engaging the listener with the text. Although widely accepted as the reason for the use of melody within Qur’anic recitation, Islamic tradition generally castigates music as an “intoxicant” that can lead the listener to unholy acts of dancing and eventually *haram* (unlawful) forms of fornication. This contradiction is at the heart of a dispute that has come to be known as the *sama polemic*. It is perhaps for this reason that the melodic elements used in Islamic recitations are referred to by the Arabic term *handasah al sawt* or “the art of sound.” Used to describe any form of artistic expression which uses the vocal or instrumental arrangement of sounds or tones, and rhythms, “the art of sound” is contrary to the term *musiqā*, which generally equates to the western term “music.” In the Arab world, *musiqā* refers to music that is, because of context or aesthetic characteristics, culturally or religiously regarded with suspicion or even condemned in conservative Islamic traditions.

From numerous experiences of hearing the *ezan* in different cities throughout Turkey, I argue that the power of a unified pre-recorded call pales in comparison to different live voices from various mosques. In Çesme, a small town on the Aegean coast of Turkey, the *ezan* that I heard during my time there was very well performed, but completely lacking in the beauty of the spontaneous and inspired performances that I had heard in Izmir, and far inferior to those that I experienced in Istanbul. After spending several weeks in Istanbul and later Izmir, I arrived in

Çesme and heard the local *Öğle* (noon) *ezan* for the first time. I was initially taken by the clarity and incisiveness of the performance skill of this *Muezzin*. Later the same day while in a different location in Çesme, I heard the *Akşam* (evening) *ezan*. As a result of my location within the town I could hear the call coming from two different mosques, and at that moment I realized that something about the *ezan* was very different here from what I had heard in Izmir and Istanbul. The call to prayer in Çesme was clearly pre-recorded, as the sound emanating from minaret loudspeakers at two different mosques was identical. Although the experience was that of a unified and in-tune call to prayer, it did not arouse emotions that could compare to the experience of hearing the *ezan* in Sultan Ahmed Square in Istanbul.

Modernity, Antiquity, and Acoustic Community

Since the time of the Prophet Muhammad and prior to the advent of electronic amplification, *ezan* was performed by a single *Muezzin* from an internal platform high atop a minaret of his assigned mosque. The call to prayer was not only a signal for the devout to stop their activities and take time for *namaz* (prayer) but historically, before the widespread use of water clocks and other early time-keeping devices, *ezan* also regulated the activities of daily life. Based not on a calendar but the movement of the sun, the time of *ezan* also varies depending on the location (longitude and latitude) of the mosque in question. Throughout the Muslim world, *ezan* times are commonly included on printed calendars, which is a necessary detail since the time of *ezan* is based on solar movement, changing the time of *ezan* with each passing day. The *ezan* is progressively later by one minute each day for most of the five calls from mid-winter to mid-

summer, at which point the call begins to move earlier in the day, following the same increments by which it progressed forward. In mid-winter, the cycle repeats itself.

For hundreds of years ezan served as not only a religious device, but also a time-keeping technology, albeit a technology in the purest sense and one without the engagement of materials outside of the human form. The non-human technological advancements that have been applied to the call to prayer are all quite recent, having taken place within the last century and since the advent of electronic amplification. The use of microphones and loudspeakers became necessary when urban centres became densely populated and congested with motor vehicles and machinery, making it difficult for the *ezan* to be heard at even a short distance from the mosque. While the introduction of public address systems and electronic amplification allowed for more effective dissemination of the call to prayer, they also led to the current state of consternation in Turkey and Egypt. Common complaints, in addition to displeasure with the ability of *Muezzin*, are with respect to the volume and often the location of the loudspeakers that project the ezan. Residents complain of a large number of loudspeakers within a small area blasting different *ezan* performances simultaneously. A simple solution, one that has been expressed countless times in response to the plethora of online news releases and editorials on the subject of the Egyptian and Turkish standardization, is that of regulating the volume of loudspeakers for each mosque and prayer hall based on their proximity to one another. This sort of restrained control would not change the nature of *ezan*, but could still make it more pleasant for the listener.

Religious Noise

The apparent point of contention in the case of call to prayer standardization appears to be noise. Noise is arguably impossible to define. Noise is in the ear of the beholder. Most definitions describe the sound as unwanted, unpleasant, disturbing, etc, but these definitions require further definition if one is to truly define noise. Perhaps the most visceral definition could begin with the knowledge that it is derived from the Latin word *nausea*, meaning seasickness, which would allow for an understanding that is purely subjective (Goldsmith, 2014). The difficulty with the standard definitions for noise is that the experience is characterized in a general way, when in fact noise is not only personal but also circumstantial. Noise is contextual. Noise is not only a matter of the volume or quality of the sound in question but also, and sometimes more often, a matter of the relationship or connection between the sound and the listener. In the case of the Islamic call to prayer; to the devout Muslim it is a sacred reminder, while to someone of another religious faith who has never encountered a religious tradition other than their own, they may consider the call to be loud, alien, and intrusive. This is an example of the relationship, or lack thereof, between the listener and the sound being heard, and its resultant characterization as noise. In the case of the call to prayer, it is clear that the standardizations and modernizations discussed are in most cases initiated by Muslims themselves and not those of other religious faiths. In these cases, they, for the most part, are dissatisfied with either the quality or volume of the recitation, or both.

The acoustic community created by the Islamic call to prayer is of particular significance within this chapter and is presented in various forms throughout this discussion. Concerning the language modernization in Turkey, one would assume that a spoken, or recited in this case,

statement would be most appreciatively received in the listeners' native language. Because it is believed that the Qur'an is to be read only in its original Arabic, the native language of the message is not, in this case, the native language of the audience. This particular situation is not only unique, but confounding. The standardization of the call to prayer in Egypt presents a different sort of confusion for me in that the citywide and eventual nationwide broadcast of call to prayer, in essence, creates an artificial acoustic community. Where neighbourhoods used to hear their own reciter of call to prayer identifying and demarcating their acoustic community, they will now have the same voice as every other neighbourhood in Cairo. As a result, each resident of Cairo will see a dramatic increase in the population of their acoustic community, without many of the other typically shared aspects of community. It is a kind of forced, or artificially constructed, acoustic community. The variety of technological modernizations and standardizations discussed in this section, and the combination of ancient tradition and communication technologies, seem to enact a contradiction of religiosity within the digital age.

Sound as Weapon

The technologies mentioned so far can be interpreted as representations of power and/or presence, but only after careful inspection of the function of the technology itself and an understanding of the power dynamic between the groups or individuals involved. The application of technologically-mediated sound that I will discuss in the final portion of this section on microphones and amplification does not require inspection, interpretation, or an understanding of social hierarchy. The application of sound technology in the examples that follow are visceral,

and without any need for gradients of contextual interpretation. They are the weaponization of sound.

Most of us are familiar with the famous scene in Francis Ford Coppola's *Apocalypse Now* in which during a helicopter bombing run over a Vietnamese village, Lieutenant Colonel Bill Kilgore, played by Robert Duvall, instructs a crew member to blast "Ride of the Valkyries" by Richard Wagner from loudspeakers on his helicopter. He tells the soldiers that "it scares the hell out of the" villagers (Coppola, 1979). Although this seems like Hollywood sensationalizing a situation and adding eccentricity to a military man, the use of sound as a form of intimidation is not purely fictional. In *Sonic Warfare* Steve Goodman states "the Urban Funk Campaign (UFC) and Wandering Soul, the U.S. "audio harassment" psyops (psychological operations) campaigns in Vietnam and Laos during the early 1970s, inspired General Kilgore's infamous Wagnerian fly-bys in Coppola's *Apocalypse Now*." The UFC experimented with tactics of amplitude and frequency. Audible and inaudible frequencies were pumped into the jungle at the Vietcong at high volume levels (120 decibels and higher). The objective of attacking with sound instead of munitions (of course, in actuality, it was sound as well as bombs) was to weaken the resolve of the Vietnamese guerrilla fighters and make them come out of hiding and surrender" (Goodman, 2010).

When U.S. troops invaded Panama in 1989 with the intention of ousting General Manuel Antonio Noriega Moreno, he fled to the Catholic 'Nuncio', "which was effectively an embassy of the Vatican" (Goldsmith, 2012). Rather than attack with weapons, the U.S. forces attacked with sound. Several military vehicles that were outfitted with loudspeakers were deployed to the location and instructed to play a variety of music at extreme volume levels. Songs chosen are

said to have included: “Nowhere to Run” by Martha and the Vandellas and “You’re No Good” by Linda Ronstadt (ibid). In this case, it would appear that the weapon of sonic volume was accompanied by a message about Noriega embedded within the songs’ lyrics. On January 3, 1990 Panamanian leader, dictator, and general, Manuel Noreiga, surrendered to U.S. forces.

Between February 28 and April 19 of 1993, U.S. federal agents were engaged in a siege with a religious group known as “The Branch Davidians” outside of Waco, Texas. Throughout the 51 day standoff, four federal law enforcement officials and more than 80 Branch Davidians died in firefights and the eventual fire that destroyed the Mount Carmel Centre Ranch that headquartered the religious group led by David Koresh (Kerstetter, 2013). As in the Panamanian case, U.S. law enforcement used sound as a weapon of intimidation and attack. In this instance the choice of sounds that were used as part of the sonic barrage included: rabbits being slaughtered, Nancy Sinatra’s ‘These Boots Are Made for Walking’, jet engines, and the chanting of Tibetan monks, “all of which were played loudly and with little intermission, for fifty-one days” (Goodman, 2010).

The fact that “we cannot close our earlids” (Schafer) perhaps makes sound the ultimate sensorial weapon. The use of extreme volume levels, as described in the previous examples, was coupled with music and sound that would perhaps be, for the listener, examples of noise at any volume. When amplified to extreme levels this noise could become unbearable, although the choice and utilization of specific sounds and music assumes something about aesthetic preference on the part of the intended forced listener.

Other applications of weaponized sound have utilized the extreme ends of the frequency range. Devices known as “mosquito alarms” or “anti-loitering devices” are speaker-equipped

electronic devices that produce continuous tones at frequencies at and above the upper range of adult human hearing. Such devices have been used by business owners to deter loitering by teenagers, and even as a “child repellant” by a couple in Suffolk, England. As reported in *The Telegraph*, a married couple aged 66 and 52 were “fed up with hearing children screaming in their garden” so they invested in a child repellant. They turn on the device “whenever, they claim, the youngsters - who are all aged under 10 - start screaming, forcing them indoors” (Horton, 2015). Like something straight out of a futuristic fairy tale, the owners of the child repellant device would leave the device on for long periods preventing neighbours’ children from spending any time outside due to the loud and high-pitched tone produced by the device. The tone produced by the “child repellant” devices generally cannot be heard by anyone in their late twenties and older due to *presbycusis*, an age-related hearing loss by which the ability to hear upper frequencies deteriorates.

At the other end of the sonic spectrum is the research and use of infrasound (sound below the range of human hearing) by military and police for the purpose of crowd control. In the case of infrasound, it is not heard but felt. “For example, a typical occurrence related to vibration is its effect on the vestibular system and the sense of orientation in which balance can be modulated” (Goodman, 2010) which can cause disorientation and anxiety. Whether at the upper or lower end of the sonic spectrum, these tools and approaches to controlling human behaviour with sound are once again visceral examples of technologically-mediated sound used for control and the assertion of power over those who are vulnerable due to situation or age. In the next section, the power of sound through technology will be discussed concerning, once again, a singular message reaching a mass audience and how this has the potential for horrific results.

Radio & Muzak

Hearing a disembodied voice coming from a great distance—a phenomenon previously available only to mystics and saints—was the experience that generated the most wonderment. Only sounds of apocalyptic dimension or spiritual origin had ever been heard over such distances, so even the voice of a mortal took on a special aura when heard electroacoustically, an aura of authority that even today has not entirely disappeared with familiarity. (Truax, 1984)

One can only wonder if Canadian-born Reginald Aubrey Fessenden would ever have imagined the cultural reach of radio when on Christmas Eve in 1906 he made the first successful long-distance radio broadcast from Brant Rock, Massachusetts. Wireless operators as far away as Norfolk, Virginia, a distance of nearly 1,000 kilometres, reportedly heard Fessenden's broadcast during which he "read verses from the Gospel According to Luke, played an Edison phonograph recording of Handel's "Largo" aria, gave a violin solo, and ended the broadcast by wishing his listeners a Merry Christmas" (*Britannica*, 2018). Even this very early example of radio broadcasting contains many of the raw ingredients of what radio is today: music and oration that projects ideologies representative of those who hold power and the privilege of broadcast capability. To imagine the wonder that must have been experienced by those who heard a radio broadcast for the first time in their lives is to understand the power that this new medium must have wielded. "In these early days, listening to the radio was an even uncannier experience than listening to a gramophone. It had been strange enough to hear someone's voice coming from a disc; for it to come out of thin air seemed, well, *incredible*" (Hendy, 2014). Unlike the initial wonder of the gramophone, that produced sound from within, the radio was producing sounds from far away; from nearly 1,000 kilometres away in the case of the Fessenden broadcast on Christmas Eve, 1906.

By the 1930s the initial wonder and novelty of radio were gone due to repeated exposure and familiarity. At which point the radio had become “a normal, taken-for-granted, enjoyable part of everyday life” (ibid). Families and friends would listen communally at home and in cafés and bars to the sounds of music of the day, news, comedy, commentary, sporting events, or radio dramas. Radio had become a nearly ubiquitous element of daily life and “was now barely noticed as anything special – perhaps precisely because of this – its influence was stronger than ever” (ibid). Not only did radio have the power to create a sense of community across communities that were within close proximity to one another, but it could also create the same feeling of connection for communities across an entire nation. “Plato, who had old-fashioned tribal ideas of political structure, said that the proper size of a city was indicated by the number of people who could hear the voice of a public speaker” (McLuhan, 1964). With Plato’s definition as a model, the “proper” size of a city was about to become limitless.

The power in the ability of radio to be heard across great distances is arguably surpassed only by its capacity to influence vast populations by disseminating a singular message to a mass audience across a vast geographic area. In the case of the muezzin reciting the Islamic call to prayer, or the Christian church ringing its bell, those with power have the privilege to project their sonic signifiers to a large geographic area and its population, thus creating an acoustic community. However, what about those who do not consider themselves to be members of that community? Perhaps the technology of radio and its long-distance broadcast coupled with persuasive oration and social intimidation could move large numbers of people to do things of which they never imagined themselves capable.

Radio in Nazi Germany

The famous Orson Wells broadcast about the invasion from Mars was a simple demonstration of the scope of the auditory image of radio. It was Hitler who gave radio the Orson Wells treatment for *real*. (McLuhan, 1964)

In his paper, “Listening to the Rain in Hildesheim, 1923-53,” Andrew Stuart Bergerson uses the term *Volksgemeinschaft*: a mass, consumption-oriented society conditioned by racism, terror, and destruction, to describe the community of Hildesheim, Germany in the late 1930s. He goes on to discuss the ways in which radio spreading xenophobic propaganda played a key role in influencing some members of the community to turn on those who had been their neighbours for their entire lives. The Nazi regime directed different kinds of programming to attract different groups within the German population (e.g., nationalists with Wagner but religious Christians with Bach). They emphasized consumer-oriented programming as a means to build consensus among the German people and distract them from the sacrifices and the destruction being conducted in their name (Bergerson, 2001). Under the direction of Joseph Goebbels, Reich Minister of Propaganda, radio became a weapon of influence; it was not a weapon to be used against adversaries but one to influence those who were either already in agreement with the Nazi ideology or close enough to it that with a little push, mostly in the form of xenophobic rhetoric and misinformation, a moderate could subscribe to extremist ideology (Hendy, 2014).

As part of the consumer-oriented strategy of mass influence, Goebbels not only crafted the messages that would be delivered to the mass audience but also oversaw the development of tools for propaganda dissemination; “They even promoted the growth of the radio audience by introducing two inexpensive radios: the *volksempfänger* and, after 1938, the small German

receiver” (Bergerson, 2001). The potency of this “people’s receiver” to the Nazi strategy was threefold; “industrialists profited from the high volume of sales, low-income consumers were given access to this new media, and the Nazi regime was given more direct access to the *Volk*” (Bergerson, 2001). The next level of effective message penetration was in the form of speaking to the audience when they were, in fact, available to listen; “The Nazi regime timed their programming to fit breaks in work and leisure-time hours and ordered that all work must stop in factories when Hitler’s speeches were being broadcast” (Bergerson, 2001). This break from labour for the workforce was likely viewed as a welcome respite and perhaps helped sway the mass listening audience to view the Nazi regime as one that respected the workforce by “allowing them the time off work to listen to Hitler’s speeches” (Bergerson, 2001).

In the early days of radio, listening was usually a communal activity, and often individuals and business owners would “play the radio in the window” (ibid), thus enacting a situation of private public space; “the radio served not simply as a medium for the distribution of (dis)information. The radio station announced your identity like a loudspeaker to all who listened along with you” (Bergerson, 2001). When business owners played the Führer’s speeches on their radios and from loudspeakers, it was a way of announcing their collaboration with the Nazi party, and in turn, “alienated Jews on the streets of their own hometown. Conformity now held racist, totalitarian implications” (Bergerson, 2001). The act of playing the radio during a Hitler speech was a public attack against those whom the Nazi party intended to vilify with their propaganda. This could be likened to a sonic version of defacing a Jewish owned business, although loudly playing a radio broadcast from a home or shop for passersby to hear, did not allow the anonymity of a late night defacing of a home or shop. These radio owners were,

knowing or not, announcing their allegiance to the Reich and approval of and support for their hateful and despicable intentions.

Rwanda, Radio, and Genocide

The Rwandan conflict can be traced to the late 19th century when Germany began to colonize the country and in an effort to divide the population and destabilize the Tutsi monarchy promoted the idea of the Tutsi as a superior people. After World War I Germany ceded Rwanda to Belgium who, in 1933, “issued a census and distributed ethnic identity cards, officially crystallizing the distinction between Tutsi and Hutu as separate races” (McCoy, 2009). Belgian bureaucrats made the distinction based on physical characteristics and measurements such as height and facial proportion, but some officials from colonizing Belgium could not visibly distinguish between Hutu and Tutsi and instead made the distinction by inquiring about the number of cattle owned by the Rwandan, with a higher number of cattle being associated with being upper class and Tutsi (idib). Rwanda declared independence in 1962, but the Tutsi-led government and military were toppled by the Hutu majority, numbering approximately 85 percent of the population, and a Hutu was named president (McCoy, 2009). The tables had turned and the once powerful Tutsi monarchy, many of whom fled as refugees to neighbouring Uganda, was now forced to function as an ostracized ethnic minority. The “racial” distinction, however, was mostly artificial and established under a colonial system. The *Rwandan Patriotic Front*, or *RPF*, was established in an effort by the Tutsis to one day return to their country, and for those Tutsis within Rwanda to live without fear of harassment for merely being Tutsi.

On April 6, 1994 the plane carrying Rwandan President Juvénal Habyarimana was shot down and within hours RTLM (Radio-Télévision Libre des Mille Collines-Free Radio-Television of a Thousand Hills) “broadcast throughout Rwanda that the plane had been shot down by the RPF and that Rwanda was being invaded,” (ibid) and the radio broadcast called for a “final war” to “exterminate the cockroaches” (Smith, 2003). RTLM had, within the previous, year been broadcasting anti-Tutsi content in the form of lively and often crude call-in talk shows that allowed listeners to voice their opinions on social issues and request music. As in the Nazi radio case, radio was used a mobilization tool for those who already held radical ideological biases toward the downtrodden ethnic Tutsis, while also demonizing moderate Hutus in the eventual Rwandan genocide in which approximately 800,000 people were killed (ibid). Although Barry Truax asserts that “For commercial purposes, the ‘community’ within the radio profile becomes a mass market” (Truax, 1984), in the Rwandan and Nazi situations I argue that the term ‘commercial’ can be extended to include more than the commonly held understanding that it has to do only with financial gain, but that it has also to do with the desired end from which an individual or group will benefit. In the case of Rwanda, the mass market was targeted, not for the sale of a product, rather, for the incitement of action and the proliferation of an ideology.

The audience for the hate broadcasts of the Nazis and RTLM was not only those who already held the ideology being professed, but also those who could easily be swayed to subscribe to an ideology that at the same time created and destroyed community. In both cases people who were neighbours and members of the same community sometimes became enemies. This created a situation that was transformed into acts of socially ostracizing those who were

once friends and neighbours and in some cases resulting in the death of one neighbour at the hand of another.

Marshall McLuhan refers to radio as a “hot” medium that offers “high resolution and auditory image” and a medium that “represents an extension of the auditory and vocal power” that he asserts to be the “bond of non literate human association” (McLuhan, 1964). He goes on to say that “as any culture becomes more cohesive and more intense, it becomes strongly separatist and exclusive. It becomes tribal” (ibid). Bergerson says that people in Hildesheim, Germany listened to the radio “not just to appreciate the music but also to preserve neighborly relationships and define their respectability and status in the neighborhood” (Bergerson, 2001) . He goes on to say that people “located their radios not within the confines of the private sphere but along its margins, in the neighbourhood in which one took part” (ibid). He describes a woman who would get up early on Sundays to listen to radio broadcasts of concerts, and she would point her radio slightly out of the window so that her neighbours should also hear the broadcast (ibid). Unlike Nazi and Rwandan radio that were blatant examples of sound mediating technology as power, this use of radio as a creator of private public space is an example of the same technology creating a positive form of community.

The use of radio to provoke and incite action on the part of the listener does not always have such evil intentions. The power of radio and sound broadcast to a mass audience can be as innocuous as playing music to be listened to while cooking dinner, or news, traffic, and weather for the daily commute, but sometimes it can have intentions of which the listener is unaware; Such is the case with *Muzak*.

Muzak

Radio and sound recording radically changed the act of listening to music, and altered the very nature of music as well. Music could now be detached from its source and its ties to any particular setting and location. This made possible at least two new modes of listening. On the one hand, it enables what Pierre Schaeffer termed “acousmatic listening”: listening to sound without any visual clue to its source. This shift was not only phenomenological but also ontological. Thus instead of existing as mere reproductions of live events, recordings disclosed ontologically distinct, virtual soundworlds. In Schaeffer’s view, this afforded a new kind of experience: that of sound-in-itself, or the “sonorous object.” On the other hand, recorded sound allowed music to infiltrate the spaces of everyday life, making possible “ambient” listening, music heard as an accompaniment to mundane activity: driving, shopping, working, etc.

(Cox and Warner, 2017)

As I write this section, I am sitting at my neighbourhood Starbucks, with many other people who also appear to be engaged in writing doctoral dissertations, typing on my laptop computer while listening to Pat Metheny on my earbuds in an attempt to block out the nearby conversations and the music being played through the cafe speakers. Sorry, Pat, but at this moment you are ‘furniture music.’ The idea of *Muzak* or ‘elevator music’ has little if any significance within the contemporary North American experience. Everything is elevator music. The music playing in the cafe goes unnoticed by the coffee drinking, laptop tapping patrons, until they hear a familiar song. No. It all seems vaguely familiar, which is precisely why it goes unnoticed. It is unremarkable. Not bad, just unremarkable. This sort of unremarkable music is only part of the story of *Muzak*. The other part is mind control.

When I think of an elevator the first image that pops into my mind is that of a barefoot Bruce Willis, playing the role of off-duty NYPD officer John McClane, attempting to thwart a diabolical and violent terrorist plan, disguised as a heist, being carried out by criminal

mastermind, Hans Gruber, played by Alan Rickman.¹¹ The elevator rides in this film are often fraught with anxiety due to the terrorist threat and the fact that the building, in the film, is the tallest building in Los Angeles. One can only imagine the anxiety that would have been felt by the passengers of the early elevators in New York skyscrapers like the Empire State Building. Building management and elevator design and manufacturing companies made it a high priority to alleviate elevator rider anxiety by initially ensuring that riders were met by an elevator attendant dressed in uniform to accompany them on their vertical journey. “But following the first appearance of Otis’ electric elevator in 1889, the flesh-and-blood attendant was eventually superseded by soft, comforting, angelic music luring and lulling the squeamish on board. By injecting ether and eliminating dross, elevator music became a style whose notes and harmonies sounded as if they were whipped up in the air” (Lanza, 2004). This example of replacing human connection with technology may well be the birth of the “smartphone zombie,”¹² as lift riders would now have something to do during the vertical ascent or descent. Instead of being bored and standing with strangers in prolonged moments of awkward and uncomfortable silence, they could listen to the music being piped into the elevator carriage and not feel the need to speak to those with whom they were sharing this confined space.

Although elevator music is nearly synonymous with the *Muzak* company, neither it nor other background music companies sold their music service only to elevator companies and buildings that housed them. “Their primary customers were places of work and recreation that used music as a mood boost” (ibid). Initially, *Muzak* played recordings of previously released

¹¹ *Die Hard* is a 1988 action film directed by John McTiernan and starring Bruce Willis.

¹² Smartphone zombie is a contemporary term commonly used to refer to a person who walks around, usually slowly, looking at the smartphone screen without paying attention to their surroundings.

music but in 1934 they began making their own recordings, and in 1936 began to pair recordings to particular times of day.

A typical sequencing program for restaurants complemented the daily eating ritual. The breakfast hours (7:00-9:00 A.M.) offered cheery sunrise melodies and caffeinated rhythms. From 9:00 A.M. to noon, background filler whetted appetites until the official lunch diet of classical and spicier strains was served. After more filler beginning at 2:00 P.M., cocktail tunes came on at 5 P.M. to mix with piano and such exotic condiments as vibraphone. The discreet and quietly classical dinner hours from 6:00 P.M. to 9:00 P.M. provided sustenance in anticipation of the evening dance protocol, which permitted increased volume and tempo the closer midnight approached. (Lanza, 2004)

Such careful attention to background music would have seemed absurd in 1936, or even today, but it was supported by research carried out by organizations such as The Stevens Institute of Technology in New Jersey who found that “functional music” reduced absenteeism, and The Medical Research Council’s Industrial Health Research Board of Great Britain whose findings showed that workers could work better and harbour less resentful attitudes toward their work when listening to appropriate music (Lanza, 2004). “Whether it was designed to increase the production rate in a factory, the consumption level in a commercial coveter, or the feeling of safety in an elevator, Muzak was thus conceived as a lubricant in a preexisting order, reducing or ideally eliminating inevitable friction between humans and their environment” (Vanel, 2008). By the 1940s the *Muzak* corporation had introduced a further refinement to their music curation philosophy: ‘Stimulus Progression.’ “Individual pieces of music were rated on their mood and pace, from, say, ‘Gloomy - minus three’ all the way to ‘Ecstatic - plus eight’. They were then programmed in sequence so that, over time, the music heard in a shop or on a factory floor moved almost imperceptibly from downbeat to upbeat in a series of fifteen-minute

segments” (Hendy, 2014). Just as with the restaurant music programming, this rating system allowed programmers to easily place music tracks within a timeline, but not in an arbitrary manner. These music playlist lists were intended to shape the human experience and change an individual’s behaviour. “The music’s ‘ascending curve’ would give workers a pep-up just as fatigue set in and their efficiency declined” (ibid). This use of sound mediating technology as a tool of power and influence is perhaps why Herve Venal refers to *Muzak* as a “coercive instrument of social control” (Venal, 2013).

In addition to the ways in which *Muzak*, background and elevator music affected the everyday experiences of working, shopping and dining, its impact is perhaps far more significant. This narrow bit of history, which could only have happened as a result of the advent of sound recording technology and radio broadcasting technology, may have implications whose ripple effects are still being felt today. When music is everywhere, there is no longer a need to listen attentively. When our ears are bombarded with music that is intentionally designed to be unremarkable, and a market for this sort of music is created as a result of demand, then music that was once intended to be remarkable could, theoretically, slip into the realm of unremarkable background music. When music is everywhere (film, television, video games, hotel lobbies, hold time when calling a utility company), how can we value it?

Whenever I have been a teaching assistant for a course, I have always included in the first tutorial session a discussion of the ubiquity of music today and the ephemerality of it only a century ago. I ask my students to “imagine a time when in order to hear a piece of music you would have had to go to a concert hall for a performance of that piece. Then you may never hear it again. Ever. Unless perhaps you were affluent enough to own a piano and to purchase the sheet

music, and you were musically proficient enough to learn to play that piece of music. Although it would never actually be the same piece of music. Not really. It would be a version of that piece of music. However, today you can find almost any piece of music that you can think of, in seconds, and you can play it as many times as you like, while you listen to it attentively or just run it as background music while you play video games, or, god forbid, do your assigned readings.” The idea that I hope to introduce with this question is related to *value*.

This dialectic continues for weeks to come as I encourage students to confront their respective relationships with music, as members of the mass consuming public, rather than their typical view of themselves, as members of a special group of the exceptional few creators of music. I ask them to consider how often they go out and pay money for live music, or how often they pay for recorded music, whether on iTunes or by purchasing a CD. In doing this thought activity I encourage them to think about: how can they expect the listeners of their future musical output to value music if they themselves do not. At the risk of blaming the collapse of the recording music industry on the *Muzak* company, I argue that the age of *ubiquitous music* that was born with the widespread use of the music services provided by *Muzak* and other similar companies somewhat devalued recorded music and, more importantly, perhaps it devalued listening.

Telephone

Selfies are the most authentic visual image of a person today.
(Warfield, 2010)

Unlike the power that radio exerts by broadcasting a singular message to a mass listening audience, the telephone is an intimate technology of presence that allows users to communicate acoustically in a way that written communication is unable to achieve. “It is evident to most everyone that the difference between transcriptions of spoken language and the original speech contains essential information for understanding the meaning of the utterance” (Truax, 1984). This *paralanguage*¹³ is precisely why two old friends now living in different cities and communicating by frequent letter writing could confuse the intent of the contents of a letter due to the absence of a comma or the use of an exclamation mark. The written word has no tone. The information communicated over the telephone is much more precise due to paralanguage.

The other significant aspect of telephone communication, compared to written communication, is the ability for real-time exchange. Rather than needing to wait for a written response from the recipient of your letter, to whom you would then respond, that in the past, before the advent and widespread adoption of the telephone as a home appliance could have taken weeks or months can now happen in minutes or even seconds. The *telephone game*¹⁴ would perhaps more accurately be called the letter writing game, as the misinformation that results from the process of the game is absent from telephone communication, but could easily result in letter writing due to the absence of paralanguage. The end of the game typically results

¹³ Vocal features that accompany speech and contribute to communication but are not generally considered to be part of the language system. ("Paralanguage." Dictionary.com. Accessed October 30, 2018. <https://www.dictionary.com/browse/paralanguage>)

¹⁴ Also known as *Chinese Whispers*, this game involves one person whispering a phrase or sentence into the ear of another, who passes it on to another. This continues until the person at the end of the line or circle reveals what they were told. The final message is often drastically different from the original message.

in much laughter by participants as they recognize how a message can become distorted as a result of transmission between multiple communication nodes.

I argue that the telephone as an everyday device of technologically-mediated sound created reliability of communication that was unprecedented. Unlike radio or amplification, the telephone is a technology of presence that can sonically bring a mother and daughter, living in different countries, into the same aural space. Schafer says that, “The telephone extended intimate listening across wide distances. As it is unnatural to be intimate at a distance, it has taken some time for humans to accustom themselves to the idea” (Schafer, 2006). “In tandem with the related sense of smell, hearing is that sense that is most deeply associated with memory. Sound evokes place, not space. That is to say, sound is where we locate ourselves, not physically, but mentally and spiritually. Sound exists inside our heads. It is our greatest experience of intimacy. It transports, it invades us” (Kaye and LeBrecht, 1998). The presence of being “with” someone on the telephone rivals or, in some cases, can be even greater than shared physical space.

I argue that one aspect of the telephone functions as a technology of power; the telephone ring. A ringing telephone has power. Its sound invites, beckons, and incites the nearby hearer of the sound to respond by picking it up, almost as an instinctive response. The ringing telephone needs to be answered in order for the cadence to be completed. The silence that follows a ringing telephone is the resolution of sonic tension. The thought of a telephone ringing and then being answered conjures a nearly endless number of situations in my memory, some from my own lived experience, although far more are from cinema and media. The archetypal, and temporal, variations of this setting are nearly as plentiful. However, in every case, the answering of the

ringing telephone seems to both complete and initiate a sort of transaction between individuals with the technology of the telephone as the intermediary.

Smartphone

The proliferation of the smartphone as the dominant mode of communication has changed the function of the phone from a technology of sound to one of sight. Whether communicating through text messaging, email, or social media, people today, particularly millennials, are more likely to use their smartphone to communicate visually rather than sonically. This preference can be attributed to the fact that phone calls require immediate attention to the power of the ringing phone; and are disruptive, whereas text-based communication puts the power in the hands of the recipient of the message, not the sender. “Because they’re just as instantaneous, but provide you with the ability to think over your words, they’re more comfortable and precise communication forms. For a group of people dubbed ‘the anxious generation,’ this is of utmost importance” (Alton, 2017).

Due to the shift in the nature of communication that has taken place since the advent and widespread adoption of the smartphone, I find it difficult to label the smartphone as either a technology of power or presence, or both. The presence described earlier concerning technologies refers to the ability of the technology to bring individuals “together,” if even in a virtual sense. The telephone brought the voice of a person on one continent into the ears and head of another on a different continent. Physical separation was effortlessly traversed via the telephone as sound-mediating technology, allowing distance to no longer be a barrier to the presence enacted by spoken communication. However, the smartphone is more and more

becoming a technology of visual communication and not one of aural communication. For this reason, I am unsure as to how I should categorize the smartphone concerning power and presence. Although the written word allows for communication and exchange of ideas and transmission of information, it does not, from my middle-aged perspective, enact the presence of a telephone voice call. Nor does it represent a technology of power, as the recipient of a text-based message does not feel the pressure to respond, or pick up a ringing phone, because they can reply to an email, text, or social media message at their leisure. Perhaps one could argue that for this reason the power enacted by the smartphone is transferred from the initiator of the message to the recipient.

The final example of technologically-mediated sound that I will present is one that is directly connected to an earlier section of this chapter in which the Islamic call to prayer was discussed in relation to the microphone and amplification. The following example explores issues of technologically-mediated sound as it relates to place-making, cultural and religious tradition, modernity, and virtual embodiment.

Mobile Prayer Apps

Perhaps the only single thing that is more pervasive in the middle east than *ezan*, is the mobile phone. The region has in recent years been experiencing what is among the fastest growth of mobile phone use in the world. The widespread access to smartphones is introducing yet another technology with the potential to alter ancient Islamic traditions. A smartphone can now alert the user when it is time for *namaz*, which direction to turn in order to face Mecca, and even play

recorded *ezan* at the appropriate time, or simply as a ringtone. A plethora of smartphone apps available for download with names such as *iPray* and *iMuslim* offer features including: “Ezan Alarm Clock” and “Islamic Compass.” These apps make it possible for the devout Muslim to adhere to accurate *namaz* times and proper rituals (accurately facing Mecca) no matter where they happen to be in the world. Although a useful technology for those wishing to adhere to Islamic practice, this sort of pervasiveness could not only be a detriment to the sanctity of the tradition, but some say that it has the potential to defile the sacred message of call to prayer. The mobile phone could ring with a reminder or incoming call at a time when the user is in a place or situation deemed “unfit” for the hearing of Qur’anic scripture or *ezan*, such as a toilet or a place where alcohol is present or dancing is taking place. This could be viewed as a breach of rigid guidelines regarding prayer in Islamic law, a doctrine that views cleanliness as essential before prayer can be permitted. Stringent and specific guidelines exist concerning washing one’s self before taking part in *namaz*, whether at a mosque, prayer hall, private home, or place of work¹⁵.

A significant level of contention already exists concerning these “mobile prayer tools,” and whether or not their existence changes the sanctity of *namaz* by imposing modernity upon the tradition. The core of the contention, that is sure to escalate, is that *ezan* is considered the word of god, not entertainment. Let us consider the reality of an *ezan* ringtone; an incoming call triggers the sound of the *ezan*, but the sacred recitation is quickly interrupted in order to begin yet another telephone conversation. The notion of Qur’anic recitation being interrupted for a reason as trite as a telephone conversation, is undoubtedly one that would be denounced by conservative Muslims. As the proliferation of mobile devices continues throughout the Muslim

8. Juynboll, Th.W. "Adhān." *Encyclopedia of Islam*, Brill Online. 2012.

world, we are likely to see even more apps designed to make *namaz* more accessible. Is this accessibility considered *halal* (legal/legitimate) or *haram* (illegal/illegitimate) within mainstream Islam tradition? If these technologies are deemed inappropriate, how will religious officials control their use? This sort of standardization is one that will not be as simple to mandate as the Cairo *ezan* standardization, and impossible to fully enforce.

Chapter Summary

A significant aspect of the histories and mythologies presented in this chapter relate to the efficacy of mediated sound with regard to enacting unique and potent experiences between individuals, groups of individuals, and between an individual and a group. Of particular relevance in this discussion is how the use of sound mediation can enact various states of power dynamic and/or acoustic community. The idea of “power and presence” was used as a scaffolding upon which various technologies were discussed in a brief historical and cultural context. From the most basic sound mediating technologies of cave resonance and bone flutes to the technologically advanced example of the smartphone, each of these technologies provides an example of the manner by which the sense of hearing and the act of listening can be harnessed; sometimes by the transmitter of the sound, while at other times by the receiver. This knowledge is significant to this project as it is applied in subsequent chapters when discussing various uses of sound in media and XR to engage an audience and immerse users within an experience.

Chapter 3

Sound and Silence in Media

Indeed, on the semiological level, perhaps the most important modernist concept is that of the hierarchical relationship between sign and referent: the image is not real, what it represents is. Within the postmodernist perspective the sign or the image has just as much reality as its referent. (Brown, 1994)

Introduction

The use of sound and silence in media is perhaps best characterized by the following phrase, taken from the quote that introduces this section: “The image is not real, what it represents is” (Brown, 1994). I use this quote as a way of characterizing the use of sound in media as it is at times used as a tool for making the visual content appear more real to the viewer; even if the added sound layer bares little resemblance to the sound that would be experienced in real life. Sound effects in media are sometimes an exaggeration of sound, perhaps as a way of deepening the viewers’ engagement in the visual experience, with sound being the only other human sense available to the director. In the section called “Para-diegetic Sound and Sound Artifice” I explore the use of “sound artifice¹⁶” in sports broadcasting; another example of using “unreal” sound as a tool for deepening viewer engagement. The expectations of the viewer, however unrealistic, must be satisfied by the content producer in order to present a comprehensive, although sometimes inaccurate, multi-sensory viewership experience. The latter, and more extensive, portion of this chapter will investigate the use of sound and silence in narrative media with a particular focus on how it serves the narrative or meta-narrative. This chapter relates to the overall project as it

¹⁶ “Sound artifice” is a term that I created in order to be able to encapsulate the use of sound effects and foley (manually created sound effects added in post-production) to create moments of sight and sound that would be impossible to experience in reality due to a perceptual dislocation of one sense from the other.

provides a further investigation of technologically-mediated listening in what is arguably its most ubiquitous form—visual-centric media. The knowledge gleaned from this unpacking of visually-based media will provide additional context for the discussion and analysis of the existing use of sound in XR and hopefully provide direction for future approaches to sound in XR as well as sound-only XR projects. In addition, this section provides a discussion of not only how sound creates a technologically-mediated viewing experience of the hyper-real, but it also explores how sound can be used to enact a kind of viewer embodiment within a visual narrative. The idea of embodiment will be further explored as it is an integral and highly desirable aspect of end-user experience in XR environments.

Diegetic and non-diegetic sound

The vast majority of the sounds that we hear when watching television, film, or Youtube videos can be classified as *diegetic sound*. That is, a sound whose source is part of the on-screen content. Although the sound producer does not necessarily have to appear on screen, it must be part of the “world” of the visual narrative. The sound of footsteps heard while the onscreen action is that of someone walking down a hallway is a simple example of diegetic sound. An example of non-diegetic sound would be the music score heard in a car chase scene. The onscreen world and its inhabitants do not hear the chase scene music. It is part of the viewer experience and is included as a way of deepening viewer engagement in the onscreen action. Although these contrasting sources of sound are mostly indivisible and experientially indistinguishable for the viewer of film and television, for the user of augmented reality they can achieve the goal of user presence. Within the locative listening experience, the mingling and

occasional uncertainty with regard to diegetic and non-diegetic sound is precisely what enacts the desirable experience of sensorial hybridity.

Para-diegetic Sound and Sound Artifice

Perhaps the most common example of para-diegetic sound¹⁷ is the *laugh track*. The sound of laughter is not part of the screen world, nor is it a sound effect used to sonically articulate, or even exaggerate, onscreen events. The laugh track acts as a cue for the audience to laugh at jokes as they are delivered within the narrative. I argue that the laugh track is *para-diegetic* in that it exists outside of, and having no relation to, the onscreen world beyond the acceptance and agreement of both parties on either side of the screen. The projection party (onscreen world) decides that jokes will be delivered with the expectation that the reception party (viewers) of the screen will laugh on cue. The completion of this act validates and realizes the unspoken contract between transmitter and receiver of the comedic narrative content in question.

I found it necessary to create the terms *para-diegetic sound* and *sound artifice* in order to be able to accurately characterize common, although, contrasting uses of sound in media. These terms, however, are not interchangeable, as the latter suggests an intent to deceive while the former implies only that the sound is “outside” the visual content and not within (diegetic) nor does it simply exist to deepen viewer engagement (non-diegetic). Another example of *para-diegetic sound* is a scene in which the onscreen image is of two people walking together off in the distance, but their dialogue is heard by the viewer as if the onscreen characters were shown in

¹⁷ “Para-diegetic sound” is a term I created to characterize sound which is neither precisely diegetic nor non-diegetic; it is sound that, although it is within the screen world, it is a pairing of sound and vision that would be impossible outside of a constructed screen-based setting.

a close-up shot. The editing that achieves this outcome is arguably used as an artistic technique, while the laugh track is a very different type of *para-diegetic sound*. Originally intended as a way of helping the audience to understand the new medium of television, I argue that its function of eliciting a concerted action across the home viewership audience is at the same time enacting community at a distance. I liken this to a kind of “virtual” version of the community enacted when a church congregation recites a prayer together. Although the community in the case of the laugh track is invisible, I argue that it is no less real.

Allusional Intent

An additional concern that I will address in this chapter is that of “allusional intent” or how the sound fits in with the scenography (Brown 2010, 131). The idea of allusional intent applies to every media example presented in this chapter, albeit in vastly different ways. This term is used by Ross Brown in his book *Sound* to refer to sound design in theatre. I will extend the use of the term to investigate the use of sound, silence, and sound-mediating technologies in relation to their potential intended ‘meaning’ by the producer, sound designer, or director.

Admittedly, sound design rarely says anything unequivocal with regard to the overall screen-based world, although it may suggest or imply intent about how the viewer is supposed to feel in the moment, it does not convey meaning in a way that can be more easily achieved by set design or costume design (Brown 2010). As Brown says, “Most of the intent is futile. At best, sound designs seem to end up being remembered by audiences and critics as a set of vague adjectives: atmospheric, haunting, moody” (ibid, 131). Having composed music and sound design for a number of media projects over the years, I understand and strongly agree with Brown’s

comment. For this reason I have chosen to mostly explore the inner workings of sound design in the examples that follow. My perspective is not so much how sound is used to create a ‘mood,’ but how the use of sound and silence attempts to achieve presence for the viewer. This relates directly to the overall theme of this dissertation with regard to mediated sound as a meaningful sensorial device for experiential immersion. Because the lineage of sound in film and television has established an expectation on the part of the viewer and a standard with regard to the visually-based media it is important to recognize established practices of sound use in media as a preface to the subsequent discussion of sound use in AR, VR, and AltR.

Semiotics and Sonic Experience

The study of signs and symbols and their meanings is applied in this chapter to sound in a variety of manner. Whereas sound design is typically discussed with regard to its relation to the narrative as a “dressing device” similar to set design, CGI (computer generated imagery), or costume design, I will investigate the ways that meaning is assigned to sound and silence as a greater thematic device. I will argue that this use creates a deeper sense of engagement and immersion for the viewer, at times enacting an intimacy between the viewer and the experience of the onscreen world. This chapter relates to the overall project in that it investigates the ways in which sound in media (specifically the use of dubbing, foley, post-production audio editing, etc.) can deepen the viewing experience in a way that would not be possible with unedited sequences without the aid of technological mediation and sound manipulation.

Brown states that “the theatrical mode of listening does not gaze uniformly, but is, by nature, a state of continual omnidirectional distraction” (ibid, 132). The uses of sound that I am

discussing in this chapter are in stark contrast to Brown's characterization due to the fact that he is referring to live theatre and my examples all involve sound that has been processed and edited in some way. In the case of *Sound in Sport* the sound is live broadcast audio but, as will be described in the following section, even this live audio is not without manipulation. Unlike live theatre, all of the examples in this chapter are carefully curated with regard to sound and vision thus drawing the viewers' attention to precisely what the director wants the viewer to make their centre of attention. In the case of live theatre, although the director can create visual and auditory cues to direct the attention of the audience, they are still free to look around the theatre at any element of the production space, including the audience, theatre interior, and other non-performance elements. In live theatre technologically-mediated sound, although complimentary to the visual elements of production, does not have the immersive power of its counterpart in the carefully edited and curated experience of film, television, video, and interactive media. The intimacy enacted by the editing and curation of media not only bestows greater power upon sound, but also necessitates its careful use in order to achieve a viewing experiencing that is not only engaging but also satisfying.

The use of sound to imbue meaning is integral to immersive and hybrid XR narrative and experiential media forms such as AR, VR, and AltR. When the user is asked to wear VR goggles or hold a mobile device in their hands in order to experience a story, they are already being expected to do far more than if they were simply watching a traditional screen-based narrative. I argue that the use of immersive sound, whether in visual and sound or purely sound-based XR, is a necessary value proposition for user engagement and retention. Immersive sound can take the form of binaural or spatialized sound and/or sound mixing that uses the principles of diegesis to

create a soundscape, that, with the aid of an in-ear or over-ear listening device, can achieve a listening experience that is both intimate and immersive.

An investigation of the use of sound design and sound editing in screen-based media is essential to this dissertation as the successful delivery of XR content is dependent on satisfying long-established viewer expectations of the ways in which sound is utilized in relation to onscreen material. In addition to adhering to screen-based narrative standards and audience expectations I believe that it is vital to challenge those standards in order to make a significant contribution to the evolution of media work. Whether in immersive or hybrid XR environments, understanding potential methods of challenging widely-held expectations while not alienating the audience is an ongoing challenge for those creating XR content.

Sound Artifice and The Sound of Sport

It's my belief that people have ingrained in them a memory of certain sounds, and if that sound is not fulfilled the mind knows there's something wrong.

(Dennis Baxter)

The Sound of Sport is a radio documentary produced by Peregrine Andrews for *Falling Tree Productions*, and originally broadcast on *BBC Radio 4* in 2011. This documentary not only introduced me to techniques of sound manipulation and real-time foley in sports broadcasting that I had never known to exist, but some of the examples presented led me to think of similar uses of sound in media which had not ever been labelled in a distinct manner. I will refer to sound events of this particular nature as either *sound artifice* or *para-diegetic sound*.

In *The Sound of Sport*, Sound designer Dennis Baxter explains some of the techniques that he has used to satisfy viewer expectations and deliver a home viewing experience that is in

many ways “more real” than being a member of the live audience for a sporting event. In order to achieve this he often uses a massive sound staff and a enormous array of recording technologies. In the case of the London 2012 Olympics, he used “350 sound mixers, 600 sound technicians and almost 4000 microphones” to create an engaging sound experience for the television viewer (Andrews, 2014). I argue that Baxter’s sound work can be characterized as either *para-diegetic* or *sound artifice* depending on the specific example. In the case of Olympic Diving a hydrophone (underwater microphone) was placed at the bottom of the pool and this sound was mixed with the sound of microphones placed poolside to create a *para-diegetic* sound experience for the viewer that, although not artificial as the sounds were real location sound, the viewer experience is artificial as the home viewer has an experience and perspective, both sonically and visually, that is far more comprehensive than anything possible for a live audience viewer.

In the case of Olympic Rowing, sound supervisor, Andy James, describes his job as “augmenting what you see with what you hear” (ibid). Microphones are positioned along the shoreline, walking path, and on the crew boats, chase boats and a body microphone is placed on the coxswain, who is responsible for steering the boat and coordinating the rhythm and intensity of the rowers. The loudness of the helicopter and chase boat required for capturing the visual of the race had the result of washing out the sound of the paddles in the water. In order to reintroduce the sound of what the viewer sees, the sound designer went out in a canoe with some rowers and recorded stereo samples of the paddles interacting with the water. Those recordings were loaded into a sampler that was played during rowing events to complete the sound experience for the audience. With Olympic Archery, the sound designers recreated the sound of

the arrow moving through the air to resemble that which would be heard in Hollywood films such as *Robin Hood*. Using a boundary microphone placed on the ground between the archer and the target, the sound designer was able to build a Hollywood sound for an Olympic event. “When we do our horse racing, you’re not going to get someone running around the course after the horses. There’s no way. And occasionally you will come across very close up pictures of the horses on the far side, which is done off of one of our roving cameras. But you have engine noise in that case so you wouldn’t want a microphone on that because all you would hear is a car revving up and a cameraman cursing. So, basically, the way you cover all that sort of stuff is to run a tape which has the sound of horses’ hooves galloping, which is actually, if I remember rightly, a slowed down buffalo charge” (ibid).

In the case of Wimbledon tennis, sound supervisor Bill Winston uses silence as a focal point for creating the drama of sport. “The dynamic range. The difference between the quietest noise and loudest noise. What you’ve got to do is time it in such a way that the second that that quiet atmosphere changes into the huge roar from the crowd, you’ve got a split second to fade down” (ibid). The technique of fading in microphones just after the point is completed allows for a dramatic moment of silence before the roar of the appreciative crowd is heard by the television audience.

The preceding examples of broadcast sound editing demonstrate both *para-diegetic sound* and *sound artifice* as tools for creating a broadcast experience with “more detail, and definition, and a hell of a lot better sound” (ibid). The moment of silence created for the home viewer creates the drama and heightened attention that perhaps is necessary to create an experience of engagement needed to keep the television audience invested in the action as they

would be at the live event. This sound artifice could be compared to the “hyperrealism” that William Wittington cites in reference to sound technology standards such as THX (Herzog, 2015). In the case of sport, the hyperrealism is achieved through foley sound effects and sound editing.

In all of the preceding examples the sound that the television audience experiences has little to do with the sound that is heard at the point of audition or the camera’s audio input. Technological mediation and sound manipulation create a listening experience for the television audience that is in some ways more real than real. Similar to the sound of a punch in the face, gunshot, or explosion in a Hollywood film, *The Sound of Sport* reveals a reality about sound in broadcast sports that demonstrates a desire by producers to create a viewing experience that is sensational and exaggerated beyond what the real sound experience would be for a member of a live audience. This creates a sense of presence for the television audience that is visceral and guided by the power of the mediated sound. In some ways the television audience is not given the perspective of spectator but one that is closer to that of the athlete. The hydrophone for diving, the buffalo stampede for horse racing, and the foley rowing paddles create a sonic perspective akin to that experienced by the athletes while the Hollywood archery sound editing and the pause between tennis point completion and applause create a level of drama for the television audience that is carefully curated by the sound engineers thus creating a level of emotional engagement and immersion that is more real than the real thing. This idea of a hyperreal viewing experience will be further explored with regard to cinematic examples in the sections that follow. I argue that the use of hyperreal sound is a value proposition similar to that of immersive sound in XR while the examples of sound intimacy and the use of silence further

inform approaches to sound mediation in XR with regard to the end user experience of hybridity, immersion, and presence, respectively.

Silence

Quiet, all of you. We're approaching the tyrannosaur paddock.
(Jurassic Park)

When I wake in the morning and stumble into my kitchen to prepare breakfast and pack my son's lunch my first action is almost always to switch on the radio that is permanently tuned to 99.1 *CBC Radio One*. When I get into my car I rarely shift into drive without first choosing and activating the sound source that will accompany my drive. Now, as I type this sentence I am sitting on my living room sofa without any chosen sound accompaniment. When I stop typing and listen, it is an eerie feeling to experience the silence "created" by my lack of activity. I become aware of my heartbeat and the most distant sounds from the street outside. The minute of silence becomes an involuntary meditation. It is as though something is about to happen; that the silence is merely a pause or transitional state between sonic occurrences or soundscapes, chosen or otherwise. I become acutely aware of the rare nature of silence. With the exception of lying in bed at night, for those who do not have noisy neighbours, we rarely experience extended periods of silence. Perhaps this is why getting away to the country, woods, or a cottage is so appealing to those of us who live in urban centres. The respite from unwanted sound can function as a sort of sonic detox. "Isolation in the past was often equated with silence—the freeing up of the individual to be alone with their thoughts—the enlightenment precondition for autonomy" (Bull 2007: 7).

The lack of conspicuous sonic material seems to make me go inward and become more aware of my thoughts and physical sensations. Left for an extended period of time I will inevitably begin to fill this empty space with thoughts related to material that is outside of my current experience: what I need to do later today, what's for lunch, etc. The silence needs to be filled. Broken. Silence is, quite honestly, uncomfortable (Bull, 2007). For the film and television viewer silence is rare. Quiet is a familiar sound design choice, but silence is dangerous and a signifier that is perhaps more powerful than any other semiotic content within the narrative as the lack of sound typically functions as either an overture to narrative progress or a repose allowing for a deep reflection of narrative material provided thus far.

Sound and Silence in Cinematic Narrative

In this chapter I will discuss a number of film narratives as a study of the use of sound and silence in media. The examples chosen were decided upon due to either their overt use of sound and/or silence as a narrative or dramatic device; the use of a sound technology as a mediation tool whose meaning, perhaps, extends beyond the obvious; or due to the way in which sound and/or silence are used as a scaffolding upon which the narrative is cast. The discussion of sound and silence in this section will investigate the use of diegetic and non-diegetic sound and technologically-mediated sound as narrative device, heterotopia, and character.

The Sound of Silence

Hush

HUSH is a low budget (\$1 million) slasher film with a slight twist. In this Netflix original production, Maddie Young, played by Kate Seigel, is a deaf author who lives alone in the woods. The film opens with an establishing shot of the house in the woods moving to the interior of the home with an accompanying soundtrack of exaggerated diegetic sounds (wind in the trees, birds, faucet running water, sizzling of food in frying pan) eventually changing to a drone that sounds like amplified silence. This drone functions as a clue for the viewer that Maddie is deaf. The terror begins when one evening her neighbour, Sarah, is murdered by a masked man just outside of Maddie's house. Although Sarah bangs on the door for help, Maddie is unable to hear her friend's screams of terror due to her deafness. As the killer is stabbing Sarah to death, he sees Maddie in her kitchen cleaning up her ruined dinner and presumably decides that she will be his next victim. While all of this violence is taking place, Maddie is unaware due to her deafness, and after cleaning up in the kitchen, she proceeds to continue writing on her laptop in the living room. Her writing is interrupted by a *FaceTime* call from her sister. During the conversation, her sister says that Maddie should move back to the city and that she could live with her. She continues; "because it's not good for anyone to be alone. Isolating yourself the way that you do." Maddie interrupts her sister to say, by way of sign language, "Isolation happened to me, I didn't pick it." This statement seems to frame the narrative interestingly, as it characterizes her deafness as a *thing* of agency. Immediately following Maddie's statement, her sister notices something move behind Maddie. The audience sees a cut to a close-up of the killer picking up Maddie's

smartphone. Maddie's statement about isolation, paired with the visual of the nearby killer, seems to place her deafness outside of herself; giving it agency as one would attribute to a character in the narrative.

The film continues with Maddie receiving a text message notification on her laptop sent from her own mobile phone. The message contains photos of herself in different rooms that appear to have been taken only moments earlier — the most recent photo showing her in her current position and activity. She turns to look at the location from which the photo was taken and notices that she has left her patio door open. When she stands and moves to look outside, she sees the masked man standing just outside her door waving to show her that he has her mobile phone. At this moment, it becomes clear that the killer is aware of her deafness. He asks Maddie if she can read his lips and proceeds to tell her how he intends to terrorize her throughout the night. The story continues in a traditional slasher film manner with characters close to Maddie being killed while she watches, a series of failed escape attempts, and her eventual victory, against all the odds, over the killer.

Hush does not so much use sound or even silence, but instead, it uses the absence of the ability to hear sound as an *unseen character*¹⁸ who shadows the protagonist throughout the film providing additional obstacles to an already seemingly impossible situation. Maddie's deafness seems to function as a kind of co-antagonist within the narrative, or at least an accomplice or weapon used by the main antagonist (the killer) in his numerous attempts to kill her. Although the film is, in my opinion, mediocre, it does present an interesting idea for analysis. The contemporary film audience is very familiar with the use of a music score to create a sonic frame

¹⁸ Character, living or dead, who is never seen but who nonetheless causes onstage reactions and can even become a presence in absence (Byrd, 2000)

for the presentation of characters as in the examples of the menacing low register semitone interval theme in *Jaws* or the “The Imperial March” in *Star Wars*, but we are less familiar with the use of the absence of a commonplace element as I am suggesting the absence of sound to be functioning as an unseen character in *Hush*. The use of the absence of sound in this film relates more to the narrative than to sound design, as it is the *idea* of the absence of sound that permeates the narrative throughout and places the viewer in a point of view that seems to be at a disadvantage due to the protagonist’s deafness. Although this film provided the opportunity to explore the use of silence or lack of sound, as an unseen character within a narrative, in my opinion, the film did not fully explore the potential for an immersive film experience within the unique scenario of a slasher film with a hearing-impaired character.

One particular element that I believe could have been explored to a greater extent is the idea of diegesis and point of audition (Chion, 2009). As the main character of the narrative is deaf and the vast majority of the filmic experience is that of the viewer as observer of Maddie, the notion of “experience” comes into question. The use of point of audition and subjective sound (Chion, 2009) creates a viewer experience in which the viewer, camera, and microphone, are given a corporality (Pollmann, 2007) whose existence is detached from the narrative experience of the main character. The meaning of diegetic sound also comes into question as it refers to a sound whose source is visible on screen but in the case of *Hush* the sound and its source only have a relationship for the viewer, due to Maddie’s deafness. As such, diegetic sound heard in scenes depicting Maddie’s personal experience, which is the vast majority of the film, function as a sort of non-diegetic sound similar to sound effects or a music score as those are not part of the experience of the screen character, although they are part of the narrative *world*, but

are included as narrative guides of sorts for the viewer. Just as Maddie does not hear the sound of running water in the kitchen sink, the sound of the water is provided as a necessary element for the enactment of embodied viewership as the absence of the sound that would accompany the visual would be distracting and could remove the viewer from the narrative experience.

Hush utilizes a viewer experience that attempts to oscillate between that of spectator and participant. The previous example of the sound of running water in the kitchen places the viewer in the position of spectator while the moments of silence from Maddie's perspective suggest an experience of viewer as participant. Due to the nature of this film being in the horror/thriller genre, the state of presence is valuable as a means of heightening a sense of empathy for the intended victim and a resultant sense of anxiety for the viewer, ultimately leading to a deeper and more immersive viewing experience. The use of sound, or lack of sound, from the character's perspective functions as an attempt to achieve presence for the viewer, much in the same way that successful use of sound in XR attempts to enact immersion and presence for the user.

Gravity

Directed by Alfonso Cuarón, *Gravity* tells the story of a NASA shuttle mission that ends in disaster. This film is used as an example of sound in media due to its unique and innovative use of sound as a means of deepening the experience of immersion for the viewer and in the hope of being able to make reference to some of Cuarón's approach in my own analysis and creation of XR projects.

The adage of "there is no sound in space" seems to have been taken to heart by the filmmaker and the result is a fresh approach to the use of sound in a film about space. What I

find most striking about the film is the way that sound is used to express haptics,¹⁹ thus extending the viewership experience to something that seems to attempt to create a feeling of virtual embodiment. As the viewer watches the astronaut use a wrench to tighten a bolt they are hearing the physical movement of the onscreen action in an almost visceral way because the two-dimensional visual projection takes on a physical presence due to the sonification of the haptic. Where the typical cinematic experience is a combination of moving image, dialogue, music score, and sound effects; some of which would be part of the diegesis while perhaps the most affecting elements for the audience would likely be non-diegetic, *Gravity* uses the vibrational sound of physical interaction as foley. In a 2013 interview with Brian Bishop, published on TheVerge.com, Cuarón describes the use of sound in the film.

The sound in the storytelling of *Gravity* is very important. There is no sound in space. So you're in the vacuum, sound cannot be transmitted through the atmosphere. Nevertheless, sound is transmitted through interaction of elements. Meaning that if our characters grab, touch stuff the vibration of that will travel to their ears. And so they will get a muffled representation of that sound.

In order to create a soundtrack that gives the audience the sonic experience of physical movement the sound design team used transducer recordings which “record physical vibration rather than regular airborne audio” (Bishop, 2013); the resultant audio for the film creates a layer of corporality to the viewership experience. The most benign onscreen physical movements (unclipping a safety cable, grabbing onto a handle) take on an unexpected level of significance, and drama, causing incidental physical actions of characters to become as important within the viewership experience as the dialogue. Just as the transduction recording technique creates a closeness to and intimacy with physical actions that are negligible with regard to the narrative,

¹⁹ relating to the sense of touch

the dialogue spoken by the astronauts in spacewalk suits is processed to create the illusion of isolation and distance from one another. This post-production construct of “closeness to the insignificant” and “distance from human contact” creates a feeling of isolation and loneliness for the viewer.

The opening scene is of the earth as seen from space with the only sound being diegetic communication between mission control and the astronauts who are on a spacewalk to repair a computer circuit board. Although the sound source is not visible, the audience is able to hear it, thus creating a quasi-non-diegetic sound, or a kind of “cocktail party effect”²⁰ (Chion, 2009). The difficulty with using terms such as diegetic and non-diegetic is that the setting of the diegesis is outer space, in which sound waves are unable to travel, therefore sound is not heard. This becomes the lens, or earpiece, through which sound in this film must be experienced and discussed. While eccentric NASA astronaut, Matt Kowalski who is played by George Clooney, is telling a funny and outrageous story about an experience that he once had in New Orleans, ground control interrupts with the message “Mission abort” (9:59) at which point the first instance of non-diegetic sound is heard in the form of a low register analog synth swell. This sound continues intermittently with the addition of sound effects and additional analog synth percussive stabs. As the action intensifies due to satellite debris passing the astronauts, so does the music score and the viewer is now in a more typical cinematic experience in which heightened action and potential for disaster are paired with a music score intended to further intensify the agitation and anxiety felt by the audience.

²⁰ “the organs of hearing, in tandem with the brain, work like a sound mixing board that can isolate and dial up a signal selected from the environment while diminishing the subjective volume of the other sounds.” (Chion, 2009, p. 295)

After recovering a deceased astronaut and assessing the damage to their shuttle, Matt Kowalski and Ryan Stone (played by Sandra Bullock) attempt to make their way to the nearby International Space Station. During the opening moments of this scene, we return to only diegetic sounds of the astronauts' conversation and the sound of country music being listened to by Kowalski. Although the situation for the astronauts is perilous, the opening of this scene feels peaceful, as we see them gracefully coasting high above the earth's surface. When the conversation turns to a discussion of Stone's life on earth and the death of her daughter, a non-diegetic music score is re-introduced. At a pivotal narrative moment Kowalski detaches himself from a cable joining himself to Stone, he drifts off into space, presumably to his death, in order to prevent Stone from being pulled out into space with him. Kowalski sacrifices himself so that Stone has a chance of survival. At 44:00 in the film, while using a fire extinguisher to attempt to put out a fire onboard a Russian space station, Stone is propelled backward. Hitting her head, she is knocked unconscious for a few seconds during which the music score stops, and we hear only diegetic sound.

At 46:12 Stone successfully detaches a capsule from the Russian space station that she plans to use as her mode of return to earth. All sound stops for a few seconds before the music score is re-introduced. At 50:00 Stone goes outside of the capsule in order to detach a parachute that has become tangled on the space station, preventing the capsule from being able to return to earth. This scene begins with predominantly diegetic sound and a subtle music score. At 1:03:00 Stone falls asleep and dreams that Kowolski is outside the capsule knocking on the hatch, although for the viewer it appears that he may have survived and is returning to Stone. He opens the hatch, at which point all sound ceases, he enters the capsule, sits down beside her and takes

off his helmet. Kowalski turns some dials on the control panel and diegetic sound returns. He takes out a bottle of vodka from beneath the seat, has a drink, and begins to give her words of encouragement, all the while we hear the sound of country music, presumably playing inside Kowalski's helmet again. Non-diegetic sound, in the form of music score, is reintroduced during Kowalski's pep talk to Stone. She wakes from her dream to the diegetic sound of an emergency siren signalling that the oxygen level in the capsule is dropping to a dangerously low level.

As the film nears completion, Stone returns to earth in the Russian capsule and crash lands in a large body of water. She opens the hatch, and the capsule begins to fill with water causing it to sink to the bottom with her inside. As her character sinks beneath the water's surface, the soundscape becomes diegetic, and we only hear the movement of water and a subtle high-pitched ringing, which is presumably the sound of her ears being affected by the pressure at this depth of water. Once she swims to the surface, diegetic and non-diegetic sound are used in combination for the remaining few minutes of the film.

Cuarón uses sound and silence with very skillful intention. Although this is not the first example of a departure from the typical sound design used for "space films" it has elements that set it apart from those that have come before. In Stanley Kubrick's 1968 film, *2001: A Space Odyssey*, the director uses sound and silence in a variety of interesting and novel ways, although I will limit discussion to that which relates to the sound of outer space. When astronaut Dr. Dave Bowman is inside the space vessel, and Dr. Frank Poole is outside the vessel on a spacewalk the sound experience for the viewer is one in which each cut between interior and exterior shots of the vessel have markedly different soundtracks. The interior shots are accompanied by the purely diegetic sound of computer instruments and the pumping of fresh air into the vessel's interior,

while the exterior shots are entirely silent. Stanley Kubrick is known for his innovative filmmaking, not least of which is his use of music score and sound. In *2001: A Space Odyssey* the silence of outer space is not only true to reality, but it also engenders a feeling of unease as the silence conveys the reality of space while at the same time playing on the expectations of the cinematic viewer experience.

With *Gravity*, Alfonso Cuarón breaks new ground with regard to sound design through his use of transducer recording to sonify the physical experience on screen, in turn making haptics an activation point for sonic experience. This use of transducer microphones provide a unique example of technologically-mediated sound as the transducer microphone not only mediates experience but “translates” it from one sense to another. This act of sonifying physical movement is a technological mediation of sound unlike any other described in this dissertation and one that relates to viewer immersion, presence, embodiment, and sound design as hyper-realism. This film provided a unique opportunity for the use of this type of sound experience due to the nature of activities that the viewer expects to see astronauts engaging in as part of the narrative. It is unlikely that a filmmaker could use the same technique in a romantic comedy, but particular moments in a dramatic or even an action film seem plausible.

The Idea of Silence

Man fears the absence of sound as he fears the absence of life. As the ultimate silence is death, it achieves its highest dignity in the memorial service.
(Schafer, 1993)

Since modern man fears death as none before him, he avoids silence to nourish his fantasy of perpetual life.
(Schafer, 1993)

Of particular interest to me, and what initially led me to analyze sound in media in this chapter, is the idea of silence. In *The Tuning of the World* Schafer writes “Man likes to make sounds to remind himself that he is not alone. From this point of view total silence is the rejection of the human personality” (ibid). In *Gravity* the filmmaker uses silence as a tool for bringing the viewer into the experience of the onscreen characters. Moments of silence seem to serve as meditations on the loneliness of Sandra Bullock’s character’s experience once her crew members have been killed. This silence is perhaps, for Bullock’s character, a forced rejection of her own human character as she must now engage in procedures necessary due to the fact that she is alone. This silence also serves a viewership function of reminding us that she is alone. The Schafer quote rings true for the use of silence in *Gravity*, reminding the viewer of both the emptiness of space and the loneliness of the situation in which Dr. Stone finds herself as she struggles for her own survival.

The well-known story of John Cage’s time spent in an anechoic chamber reveals a potential reality that, whereas noise is a real state of being, silence may be a fictitious state. Upon leaving the anechoic chamber Cage told the engineer that while in the chamber he had been able to hear two sounds; one low-pitched and one high-pitched, to which the engineer responded that what he had heard was the high pitch of his nervous system and the low pitch of his circulatory system

(Sorensen, 2009). Cage concluded that “There is no such thing as silence. Something is always happening that makes a sound” (Schafer, 1993: 620). Silence is a word that implies a complete absence of sound, an “absolute term” (Sorensen, 2009) describing a state that does not actually exist. Rather, it may be a state that exists in our collective imagination, but one that is idealized and cannot be achieved or experienced in reality. What is perhaps the most famous piece by John Cage, *4’33”*, was said to have been inspired by Cage’s visit to the anechoic chamber where he fully expected to experience silence, but did not (ibid).

Although the “absolute term” (Sorensen, 2009) and state of being that “silence” conjures in our minds is never experienced by most, in the experience of Maddie in *Hush* and Dr. Stone in *Gravity* it may be closer to an idealized sonic state imagined when thinking of the word.

Although I cannot pretend to know the sonic experience of an individual who is unable to hear, I argue that it is fair to say that the notion of silence for Maddie is closer to an absolute term. This realization adds a layer of meaning to the narrative in which she finds herself isolated in a cabin in the woods. Where the silent serenity of such a place would bring a sense of calm to those with hearing, to her it would have no effect. Her *umwelt* (experience of the world) becomes a barrier for narrative experience, thus bestowing great power to the “unseen character” that is her inability to hear.

I argue that the same “absolute term” of “silence” in the context of *Gravity* means something quite different. Although Dr. Stone is in the silence of space, when the audience hears the transducer recordings of physical interaction that they see on screen we understand that the character on screen is hearing the same sounds and thus privy to the unfolding narrative at that moment in the same manner as the viewer. In *Gravity* there is no “unseen character” as in *Hush*

so the viewer never has the feeling that the protagonist is at a human disadvantage compared to their own vantage point. The perspective and point of audition in Cuarón's film is often quite intimate, thus bringing the viewer inside the point of view of Dr. Stone and enacting a sort of viewer presence.

“This is the mechanism of the law at its minimal; it expects nothing of us, it does not command, we can always oppose commands and injunctions, but not silence. Silence here is the very form of the validity of the law beyond its meaning, the zero-point of voice, its pure embodiment” (Dolar, 2006: 173). It is this “pure embodiment” that finds its power in *Gravity* through the use of silence. The film example that follows further explores the idea of silence and its power as a technique for enacting viewer immersion and presence.

A Quiet Place

When there is no sound, hearing is most alert. (Schafer, 1977)

A Quiet Place is a 2018 film that tells the story of a post-apocalyptic world in which a family is forced to live in silence while hiding from monsters with ultra-sensitive hearing. Co-written and directed by John Krasinski, who also stars as the family patriarch, the film explores sound and silence from the perspective of it being a forced state of existence and how that impacts individuals and their relationships with each other. The imposition of silence creates a family dynamic that is fraught with solemnity and a lack of outward emotional expression that borders on stoicism, in stark contrast to what the film or television audience is accustomed to in family narratives.

The only scene in the film that depicts the characters interacting in a purely emotional way is one in which the parents slow-dance together. At first, we see them dancing to what seems to be an imaginary song, which would be in order considering the film's narrative setting, but after a few seconds the mother, played by Emily Blunt, removes a single earbud from one ear and places it in her husband's ear. As the earbud passes between the two characters we hear that the song she has been listening to is "Harvest Moon" by Neil Young. We hear the opening line of the song: "Come a little bit closer. Hear what I have to say" which neatly encapsulates not only the moment but the essence of the entire film. This scene, lasting just over one minute, is the only *release* from 90 minutes of individual and family *tension* imposed by their necessity for silence that functions as a prison within which they try to live "normal" lives that include cooking, home-schooling, food-gathering, etc. The dancing scene amplifies the state of imposed silence as the loving couple can only express their affection for one another through subtle touch and movement and without the use of words. This is one of the only moments in which we witness people interacting in an intimate way.

In another scene in which the father takes the son fishing, although the boy is reluctant to go because he is highly anxious about the danger of the monsters, the natural sound world becomes a mute button for human activity. When the father removes a caught fish from a trap it slips from his hands and the son turns to run away, afraid the monsters will hear the sound and attack. The father calms the boy and explains, by way of gestures, that the sound of the rushing river functions as a mask over their sound-making which prevents the monsters from being able to hear their activities. In the next scene, the father and son stand under a waterfall and the thunderous sound of the falling water allows the father to yell loudly without fear of being heard.

The father invites the son to do the same, and he releases a loud howl. The ability to vocalize to such an extraordinary extent provides a moment of freedom for both father and son deepening a bond that has been mostly absent due to their inability to communicate freely.

In the scene that follows the father and son are walking down a path in the woods and pass a cabin. We suddenly see an elderly man standing at the edge of the path, and the camera cuts to the corpse of an elderly woman, presumably the wife of the elderly man. We see the tension build in the elderly man as his face contorts until he lets out a scream that shatters the silence and within seconds attracts the monster which kills the elderly man. The meaning of the scream is of particular interest to me in this scene as it almost seems that he was waiting for another person to be present before he would, or could, scream. The presence of other people, the father and son, enacted a response that was either socially normal or humanly necessary. The outward expression of grief, or any other emotion, is best suited for an audience without whose presence there is no personal external world beyond sensory input. Perhaps the scream only seems necessary or appropriate if there is an audience for its reception. It is as though there was no need for vocalization until there were ears to receive the sound and its intended message.

This film was chosen, and its release highly anticipated by me, due to its exploration of the experience of silence, and particularly, extrinsically imposed silence. Unlike the monk who decides that he will commit to a vow of silence, the imposition of silence in *A Quiet Place* is not for personal development or a test of one's level of discipline, but out of necessity and survival. Similarly to *Hush*, *A Quiet Place* uses silence as a narrative setting and plot development device in which it disempowers the protagonist (Maddie, the family) thus empowering the antagonist (murderer, monsters). I argue that *A Quiet Place* goes a step further with its use of silence as a

type of disfunction within a family setting that creates a new, almost unrecognizable, family dynamic that is physically and emotionally muted as a result of the lack of sound. Schafer's quote that "From this point of view total silence is the rejection of the human personality" nicely embodies the setting of *A Quiet Place* in which the family seems devoid of the typical screen family relations and behaviours and instead appear to relate to one another in an emotionally muted manner.

The use of sound in *A Quiet Place*, although not directly relatable to XR in terms of recording and editing, is valuable as an exploration of a conceptual approach to sound and silence in XR experience. An immersive work that utilizes sound sparingly rather than as a continual soundscape could prove to be much more immersive, encouraging the user to go inward rather than be distracted by a constant bombardment of sound. The challenge of IRL (in real life) ambient sound in immersive XR experiences can be offset with the use of white noise that masks IRL sound while at the same time not containing any meaning that would guide the user's attention away from their own presence. This use of white noise as IRL sound mask would be effective and desirable in a VR setting, although I would not utilize such a sound technique in AR or locative work due to the highly desirable user experience enacted by the hybridity achieved by the blending of IRL and virtual sound and the resultant blurring of the border between the two.

Chapter Summary

The goal in this chapter has been to present examples and interpretations of the use of sound and silence in media. The quote from *Overtones and Undertones: Reading Film Music*, "The image

is not real, what it represents is” (Brown, 1994: 236) informs the investigation in the first part of the chapter exploring sound in sports and the use of the laugh track. The “representation” that Brown discusses is perhaps the viewers’ participation in the humour, once the laugh track has cued them to act in the prescribed manner. The laugh track, in addition to alerting the viewer to an expected emotional response, enacts a kind of community for those who react to the cue and laugh in unison with others in their company and across a viewing audience that could, in some situations, number in the millions. Acoustic community is enacted within immediate physical space and potentially across cultural and ideological borders.

In the case of sound in sports, the viewer experience is of the representation and not the thing that is being represented as an accurate representation of the thing that would lack the sonic layer required for the intended hyperrealism of the home viewership experience provided as a result of the sound artifice. This artificial sonic layer demonstrates the ‘power’ of the broadcaster to enact a heightened ‘presence’ for the viewer, and a deeper engagement in the on-screen action. Perhaps a form of deception, this use of an altered sound layer amplifies the emotional engagement in a way that altering the visual in a similar manner would likely be detected by the viewer and dismissed as trickery.

Just as stillness is thought of as a pause between movements, silence is mostly experienced as a respite from noise rather than a moment in and of itself (Farman, 2012). The films discussed in this chapter address those moments of auditory stillness when they are treated as significant events rather than punctuation within sound-filled cinematic scenes. The investigation of sound and silence in *Hush*, *Gravity*, and *A Quiet Place* explored how the use of perspective silence could function as a kind of invisible character. The absence of listening enacts a state of

heightened viewer anxiety, transducer recordings can sonify that which is typically understood to be silent, and the imposition of silence can create an existence of near imprisonment, respectively.

Discussions of these examples were used due to their relationship to similar approaches in creating XR projects in which sound is a significant element of immersion and presence and plays an internal role in the nature of the desired user experience and/or narrative being delivered. The knowledge of hyperreal sound and sound and silence within diegeses informs the practice of sound design for visually-based XR environments, sound-based apps and XR experiences, location-aware media and locative listening projects. The next chapter will discuss sound in everyday interactions with ubiquitous technology, XR, and its use in mobile apps that are intended as experiences with sound as the primary sense of engagement.

Chapter 4

A New Aurality

Introduction

In 2004 I purchased two Valentine's Day gifts for my wife. In addition to the delivery of a dozen red roses that arrived at her workplace on the morning of February 14, later that day she arrived at home to find a white rectangular box waiting for her. Inside was something that would change the way she experienced public and private space alike. It would transport her into the future by allowing her to have what would eventually become an almost limitless choice of listening content, while simultaneously reminding her of a time when a younger version of herself would listen to Madonna's *Like a Virgin* cassette on a Sony Walkman. When she opened the package, she was not quite sure what she was holding in her hand. It was the iPod. This particular model was the second generation, iPod Click Wheel, Model A1059. I had preloaded her new commuting companion with a variety of songs that would be her soundtrack to and from work each day. She would later recall how she noticed that people had looked at her inquisitively as she sat on the subway, likely wondering about the white wires hanging from her ears. Those white wires and earbuds would soon be ubiquitous because by 2007, only five and a half years after the original product launch, 100 million iPods had been sold worldwide²¹. Now there were 100 million people floating around on their own sonic lifeboats, alone, while in a crowd. Just imagine trying to decide which songs you would choose to take with you each day. Soon you

²¹ <https://www.apple.com/ca/pr/library/2007/04/09100-Million-iPods-Sold.html>

would not have to decide. You could hold your entire music library in the palm of your hand, and you could take it *to go*.

I have to mentally strain to remember the experience of life without pervasive mobile technology; before you could have *1,000 songs in your pocket*²². Anyone of post-secondary school age or younger will only know of this time through stories their parents tell them, or old movies and television shows where characters use a telephone booth to make a “voice” call or sit at a desk to type an email message on a keyboard tethered by a grey wire to a hulking grey computer CPU tower. As the iPod evolved into the iPhone, mobile technology has not only changed the *way we do things* but *what things we do*. The pervasiveness of mobile technologies allows us to communicate far more than would have been possible just a decade ago. Text, email, *Snapchat*, *Facebook*, *Twitter*, and *Instagram* are just a few of the ways that people can stay in contact with one another using their mobile devices. However, these and a plethora of other popular social networking applications have seen the smartphone transform itself from a tool of *aurality* to one of *visuality*. How did this happen? When I purchased an iPod for my wife in 2004, mobile communication was intrusive and interruptive; today it is much more discrete. A contemporary lecture hall could be filled with 200 university students communicating with another parallel lecture hall about their respective Friday night plans without disturbing anyone but the other participant in their respective text message exchange. As sound continually becomes more of an extraneous functionality of mobile devices, the *experience of sound* is precisely what I believe is required to provide more profound engagement with content delivered through mobile devices.

²² The original slogan for the iPod marketing campaign.

My goal with this chapter is to discuss a variety of everyday contemporary experiences with technologically-mediated sound and to explore and evaluate their efficacy in conveying meaning and, in the case of mobile sound apps, enabling immersion. With regard to sound-based mobile apps, I attempt to better understand the determinants that distinguish a mobile sound app that engenders a meaningful, immersive experience from one that is a sound-based game. In order to arrive at this end it will be necessary to define and contextualize existing and author-generated terminology, evaluate the potential end-user experience by personally using the apps from a qualitative research perspective, and compare and contrast the effectiveness of the mobile apps from various perspectives including interaction design, immersive vs. interactive, comprehensiveness of sonic experience, sound app as sound art piece, and possible applications for these apps beyond their intended purpose.

My interest in immersive sound stems from a practice in the creation of augmented reality, virtual reality, and alternate reality experiences that utilize sound as the primary point of sensorial engagement. In addition to analyzing mobile sound apps in this chapter, the chapter that follows will discuss sound-based creative works of art by other creators as well two of my own sound-based mobile pieces (*Strathroy Stories* and *Thing of Shapes to Come*) as a way of engaging in a ‘Research Creation’ approach in order to gain a deeper understanding of how to create meaningful and immersive technologically-mediated sound-only experiences. The hope is that these experiences can be delivered to audiences of not only sound art devotees, but also the general public.

Sonic Interaction Design

Sonic Interaction Design (SID) is an interdisciplinary field that works at the intersection of sound and music computing, interaction design, human-computer interaction, novel interfaces for musical expression, product design, music psychology and cognition, music composition, performance, and interactive arts (Hermann, Hunt, Neuhoff 2007). My interest in SID is rooted in a desire to understand what makes a successful (satisfying, engaging, memorable, comprehensive) end-user experience with regard to mobile interface use, and, more specifically, with mobile interfaces that use sound as their primary point of sensorial engagement.

In the summer of 2013, I was part of a team²³ that designed the “Land|Slide AR” app²⁴ which was released on both the iTunes Store and Google Play Store. As I began to think about the process and problematics of designing for a mobile device, my belief was that it would be as simple as taking an interface that exists for a larger digital format and merely reducing it in scale and reconfiguring navigation for the smaller mobile screen and limited mechanical interface points. It turned out to be a bit more nuanced than I anticipated. I found that the notion of intuitive design varies from print media to desktop to mobile. The what, where, and how of end-user expectation are fluid across platforms and content category. This experience taught me a great deal about the value of interaction design, although I did not know at the time that it had an actual label, and the power of elegant simplicity as a guiding principle for mobile interface design.

²³ AR design team leader: Andrew Roth. Team members: Adonay Guerrero & Tony Vieira

²⁴ This app was designed as a geo-locative augmented reality companion mobile app for visitors to the exhibition of the same name that took place in Markham, Ontario from September 21-October 14, 2013.

One thing that became abundantly clear to me with regard to mobile interface interaction design and end-user functionality was that although most visual aspects of the interface needed to be miniaturized in order to fit on the small screen of an iPhone or Android device, sound had complete immunity. In fact, the opposite was true of sound as it could be expanded and exaggerated with the only limitations being the size of the sound file and the skill of the content creator. What a revelation. As viewership among millennials²⁵ increasingly moves away from one of a shared experience in front of the family television, as was the experience of my youth, and toward the intimacy of a small screen in the palm of their hands with buds firmly planted in their ears, sound finally has the opportunity to have its period of primacy. I remember just a few years ago seeing my teenage niece watching Youtube videos on her iPod and wondering why she wasn't watching on her computer screen. Now, with my 11-year-old son doing the same, I realize that they are experiencing *their* content *for themselves*. It does not require consensus among a group of friends or family sitting in front of the television, and the intimacy of the viewership makes it almost an interactive experience, as though the *Youtuber* is speaking directly to them about the latest video game console or Star Wars Lego set. This kind of sensory intimacy is at the core of the sound-based XR practice that I continue to explore through creative work and research.

Sound as Micro-Interaction Feedback Mechanism

The vast majority of mobile apps are intended for interaction that is purely a combination of visual and haptic. Although many apps do have a sound component, it is, for the most part,

²⁵ Individual born between roughly early 1980s to early 2000s.

superfluous to basic functionality. The sonic component in these cases could be labelled a micro-interaction. In many cases, these micro-interactions are entirely artificial and could be further labelled as rudimentary forms of augmented reality because they function as a digital layer that is superimposed upon a real-world interaction with the technology. When I type on my iPhone or iPad keyboard I hear a clicking sound unless I change this in system preferences. My interaction with the physical object does not generate the sound, the software creates the sound as a guide for me to know when I have touched the screen. These micro-interactions are assigned a sonic event as a sort of feedback mechanism.

We experience sound-based micro-interaction feedback almost every time we use technology. These subtle sonic signifiers can communicate simple and inconsequential messages such as a descending major third in a bell-like tone when the refrigerator door is left open for more than 30 seconds, or more layered messages such as the song “Sweet Love” by Anita Baker²⁶ playing as a ringtone on my iPhone when my wife calls. The first micro-interaction being generic in nature and nothing more than a sonic tap on the shoulder that has little meaning until the listener makes the connection between the sound icon and the refrigerator door being left open. The ringtone, however, has prior meaning beyond the assignment to a telephone address book entry because it was our first dance on our wedding night. The act of leaving a refrigerator door open generates the message of “close the refrigerator door” that is then communicated to the user by way of a sonic signification. The particular quality (pitch set, timbre, rhythm) will very quickly become associated with the act of leaving the refrigerator door open and trigger the response of turning and closing the door almost as a reflex. This sort of

²⁶ Track on the the double Grammy award winning album *Rapture*, released in 1986.

practical feedback mechanism is one that could only be sound-based, as I could not imagine a functional mechanism utilizing another sense alone. Perhaps a blinking light to accompany the sonic reminder, but not the visual without the aural. This is due to the fact that aurality is nearly always available. “We have no earlids. We are condemned to listen. But this does not mean our ears are always open” (Schafer 2003).

Sound as More than Feedback

... the primary function of auditory perception is to discover what
sounds are the sound of... (Clarke 2005)

When I have undertaken sound experiments²⁷ with friends, family, and students I invariably begin with a discussion about the difference between *listening for sounds* and *listening to sounds*. My explanation typically goes something like this: “When *listening for sounds* we become the child who pushes the button on the *Fisher-Price Little People Animal Friends Farm*²⁸ to hear the cow go “moo.” We are concerned with the origin of the sound rather than the sound itself. When *listening to sounds*, we are aware of the various qualities of the sound in the same way that one would encourage a child to describe the physical features of an object that they cannot see but can only touch. Not to attempt to guess *what it is*, but to experientially describe *how it is*. When *listening for sounds*, we are treating sound as mere feedback of

²⁷ Simple exercises where individuals are asked to listen and identify what they hear. Then to listen again, but this time they are specifically asked to describe the quality of the sound they hear. Sometimes the activity is done with eyes open, other times with eyes closed.

²⁸ Plastic toy depicting a farm, with barns containing various typical barnyard animals. It can be closed up to carry with attached handle or opened up to expose the interior of a barn, animals and their pens and stalls.

something else, thus relegating sound to the status of second-class sensory citizen. When *listening to sounds* we give sound significance as a thing unto itself.

Enabling Sonic Immersion within AR, altR, & VR Environments

Immersive vs. Interactive

Perhaps the most familiar example of a comprehensive digital immersion would be the *holodeck* from the *Star Trek: The Next Generation*²⁹ television series. The *holodeck* on the *Enterprise* provides the user with a three dimensional recreation of a setting of their choosing. Of course, this is the stuff of science fiction, but Virtual Reality is already bringing games and films to a level of immersion that is impressive.

The goal of immersion is to surround the participants with sensorial (primarily visual) stimuli in order to evoke a sense of displacement (Margolis 2014). The real experience is mediated by digital technology that provides the virtual content or augmentation of the real input data. In the case of VR, the user enters the immersive virtual environment (IVE) by wearing a head-mounted display (HMD) of some sort, and there are currently numerous products available such as Oculus Rift, HTC Vive, Microsoft HoloLens. These products are intended for use with computer-based applications while mobile device VR can be experienced using a variety of more economical interfaces such as Google Cardboard or Samsung Gear VR. I firmly believe that immersion does to some extent depend upon the believability of the content being delivered.

²⁹ Television series (1987-1994) created by Gene Roddenberry. The *holodeck* appears in numerous episodes of *Star Trek: The Next Generation*, which I regularly watched as a teenager, and again in the series *Star Trek: Voyager*, although I do not remember watching any episodes from this series.

That is not to say that a VR experience involving a ghost or a dragon could not possibly be immersive, but the quality of the sensorial representation of the content within the experience will contribute to the depth of immersion for the user. When the graphics or sound design does not closely resemble what the user would consider realistic, whatever a dragon would look or sound like, one finds it difficult to believe in the experience. I argue that this belief is essential to immersion, otherwise the experience will merely feel like playing a video game. This notion of *plausibility* is significant to my research as it is a metric that I will use in my analysis of several sound-based mobile apps as a means of evaluating their effectiveness as immersive experiences.

Interaction or *interactive* within this chapter generally refers to the end user's experience with the interface with regard to ease of use and flow of information (haptic, aural, visual) between the user and the application. All digital games are interactive in nature, as the user is continually responding to data being delivered by the application to which the user must, to progress, respond to haptically. In some cases, interaction input can be vocal. In these examples, sounds produced by the user and/or their surroundings could be used as input to be manipulated in order to further the immersive experience.³⁰

Augmented Aurality

The term *augment* is generally understood to mean the act of making something greater or larger. In music theory, an interval of an augmented fourth, spanning six semi-tones, is greater than the interval of a perfect fourth, spanning five semi-tones. Beyond the mathematical nature of the

³⁰ In apps such as “Dark Echo” and “The Night Jar”, binaural audio is used as a way of deepening the immersion. The user listens to the sounds around him as an aural map through the digital space. Listening carefully can prevent the user from making mistakes within the game.

expanded interval is the drastic difference in the sonic quality of the augmented fourth, or tritone, giving it an unusual sonic quality compared to other intervals. This “strangeness” of sound quality translates nicely to a discussion of augmented reality and, specifically, *augmented aurality* as a method of expanding mobile listening into an experience beyond merely the passive reception of music playlist or podcast content. Augmentation of sonic experience could be achieved through the use of technical processing of recorded sound using digital effects (reverb, various filters, delay), recording sound content using spatial or binaural recording techniques,³¹ or by creating a feeling that I will refer to as *acousmatic*³² *anxiety*, by which the listener experiences a feeling of unease due to hearing a sound whose source is not only not visible at the time, but whose presence would be highly unlikely or even impossible. This juxtaposition of real sound, modified real sound, and virtual sound is what I believe contributes to a deeply immersive augmented reality sound experience. When playing a video game if a user hears an acousmatic sound they may look around (within the game environment) for the source. If they are unable to find the source of the sound they may think that something dangerous is going to happen in the game, thus creating a sense of tension for the player within the game experience (Abdel-Meguid & Toprac 2011). The technique of creating a feeling of acousmatic anxiety is a compelling narrative technique that I have used when creating AR pieces, thus deepening the feeling of immersion for the end user.

³¹ *Binaural* sound is achieved when a recording is made by placing 2 microphones in specific positions to create the experience of three dimensional stereo sound.

³² *Acousmatic* refers to a sound that is heard without seeing its source or origin.

Augmented Reality Sound vs. Virtual Reality Sound

In contrast to traditional VR, in AR the real environment is not entirely suppressed; instead, it plays a dominant role. Rather than immersing a person into a completely synthetic world, AR attempts to embed synthetic supplements into the real environment. (Bimber, Ramesh 2005)

Virtual Reality seems to be a catch-all, generic category to describe a technologically-mediated experience with any degree of immersion. The critical distinction to make between virtual reality and augmented reality is the experience of *hybridity*. Within virtual reality, an experience is deemed successful when the user's real-world senses are suppressed to the point where, beyond what is felt on their skin, stimuli is purely digital. Augmented reality, and alternate reality for that matter are most effective when the line between real and digital, or IRL (in real life) and virtual, is as blurred as possible — this dislocation of senses as a result of the hybrid experience I refer to as *sensorial heterotopia*. *Sensorial* referring to the senses (visual, aural, etc.) and *heterotopia*, as described by Michel Foucault, refers to location or site of mixed, joint experience.

From the standpoint of the mirror I discover my absence from the place where I am since I see myself over there. Starting from this gaze that is, as it were, directed toward me, from the ground of this virtual space that is on the other side of the glass, I come back toward myself; I begin again to direct my eyes toward myself and to reconstitute myself there where I am. The mirror functions as a *heterotopia* in this respect: it makes this place that I occupy at the moment when I look at myself in the glass at once absolutely real, connected with all the space that surrounds it, and absolutely unreal, since in order to be perceived it has to pass through this virtual point which is over there. (Foucault 1967)

Although Foucault states that the mirror is the heterotopia, I argue that the mirror is also the interface which is enacting the state of heterotopia, just as the digital device and its software application are enacting the augmented reality state for the user. It is this *sensorial* heterotopia,

or hybridity, that I assert to be a potent and essential agent of experiential immersion within hybrid environments such as augmented reality and alternate reality.

Interaction Analysis as close reading of sound-based mobile apps

Upon embarking on the task of analyzing mobile apps for their efficacy as immersive, interactive, or immersive/interactive apps, I searched the *iTunes Store* for candidates beyond those that I had already installed on my iPhone. Although I downloaded 25 additional mobile apps, only six were analyzed for this portion of the chapter as these exemplified the elements that I wish to study in this chapter, namely how a mobile app can effectively enact a state of immersive or hybrid listening. An analysis was carried out through the “earpiece” of: sonic plausibility, hybridity, and acousmatic anxiety, as I felt that these traits would engender the most comprehensive sonic experience for the end user. Several of the apps that I had intended to analyze are location specific and were not analyzed as they require the user to be in a specific location (Amsterdam, Lower Manhattan, Pittsburgh) in order for the app to function. What follows is an interaction analysis of six sound-based mobile apps.

Dark Echo

The electronic press kit for *Dark Echo* begins with the following: “Trapped in darkness, you must use sound to guide your way through threatening environments. The sounds you create will bounce off obstacles, revealing the shape of the surrounding world. It won't be long before your only way of sensing the world attracts a horrifying evil that devours both sound and souls” (Dark Echo, 2019). Although I am not a huge fan of the horror genre, I was intrigued by the app

description and wondered if it could in fact deliver on the promised experience. In Stage 1, I was instructed to tap and hold the screen to move in the direction of my choosing until I found a door that creakily opened and allowed me to enter the next stage. In Stage 2, “Escape,” I had to tap the centre of the screen to generate a sound which was in turn visually represented by white lines moving in every direction from the sound source and location on which I tapped my finger. By pressing, holding, and releasing the centre of the screen, a louder sound was created. The object of this level was to escape the room by using sound as a guide, but the visual was far more informative, and the sound functioned almost as a prop or sound effect.

After wandering around for several minutes in game and triggering the sound of shattering glass several times, I eventually found another creaky door. This door led me to Stage 3 “Death”. As I moved through this level, I found that the sound and visual were identical to the first two levels until I approached an area where the lines generated by the sound of footsteps were red and within a few more steps I met my death. My demise sounded like I was being struck with a large knife or axe, followed by the sound of a man, presumably me, screaming in pain and terror, and capped with the sound of blood splattering and dripping on a hard floor, and a hint of the buzzing of a fly. After several unsuccessful attempts, I eventually made my way down a corridor that was flanked by ominous red lines and the sound of many flies. At this point, I opened another door, this one leading to Stage 4, “Fear.” In this level, I was quickly killed and eaten by an animal of some sort.

My virtual death was accompanied by the sounds of chewing and bones being crushed. Stage 4 was by far the most unsettling and frightening of all. On an immersive level Stage 4 was effective as it did incite a sense of acousmatic anxiety on my part, although the stages leading up

to it were lacklustre and I found myself wanting to quit the game on numerous occasions. My desire to quit the game is a critical one concerning designing a compelling, immersive sound-based game as my experience with several attempts at completing each stage was frustrating, whereas a similar experience within a visual game would likely not have engendered the same level of monotony and irritation. *Dark Echo* nicely illustrates the challenge with sound-only XR of holding the user's attention while in-game and making them want to continue with the experience. I would categorize *Dark Echo* as an interactive sound-based game with a shallow degree of immersion, likely due to its very low sonic plausibility coupled with a lack of hybridity within the game. The haptic interaction was typical of a mobile game but did not allow me to forget about the visual supremacy of the typical game engagement.

Audio Defence: Zombie Arena

I am not a fan of *first-person shooter* games, but I did enjoy playing *Audio Defence: Zombie Arena*. This game is a perfect example of an acousmatic anxiety experience where the sounds of rustling, crows, and, of course, zombies, induced a level of anxiety that I would compare to a *Hardcore* level experience at a haunted house on Clifton Hill in Niagara Falls. I was terrified. This game experience was another revelation as it became evident that sound alone could induce fear within a game environment, without the need for a visual component. The potency of sound alone was surprising as this was the first game that I had ever played where the only visual interface required was used for choosing whether I would strike the attacking undead with a frying pan, pistol, or automatic weapon. I could not play the game for more than five minutes as

my level of acousmatic anxiety was starting to get the best of me. The binaural sound was a crucial element in the immersion as the sounds were emanating from all directions around me, creating a level of immersion that I had never before experienced. I would say that *Audio Defence: Zombie Arena* was extremely successful as an immersive interactive game due to a high degree of sonic plausibility, sensorial heterotopia, and dizzying degree of acousmatic anxiety. I would like to play the game again, but only surrounded by familiar faces on a very sunny afternoon.

The experience of playing *Audio Defence: Zombie Arena* was informative with regard to several aspects of this dissertation project including sonic immersion, use of binaural audio, and hybrid experience. The techniques employed by the app designers to immerse the user in the game environment while at the same time making them aware of their real surroundings created a comprehensive sensorial experience that utilized the hybridity of the in-game world in tandem with the user's IRL setting. My experience with the game was such that even though I was sitting in my very familiar and well-lit kitchen, I still felt moments of anxiety. I attribute the app's ability to instil anxiety and uneasiness to its very affective use of binaural audio combined with a well-crafted soundscape. This app provided an excellent reference point for the creation of my own sound-based hybrid projects as well as a high-water mark for the assessment and evaluation of other sound-based projects.

Sound Swallower

This is a locative game in which the user must walk around real space in order to make virtual contact with objects on the screen. The game player's avatar is a triangle while the sounds to be

collected or “swallowed” are represented by yellow circles, and a red amorphous shape that represents the “sound swallower” who is the “boss”³³ within the game experience. The interface is much like what one would expect from “Asteroids”³⁴ or other early arcade games in which crude geometric shapes are used to represent key elements of the game. When the user comes into contact with a yellow circle, a RECORD button appears, and he must record the object’s sound by pressing the button then returning to the game’s starting point to drop off the sounds and continue to collect more sounds, in turn, amassing points within the game.

I was only able to use this game on a preliminary level as it required far more physical space, to make virtual contact with the game objects, than my backyard or the interior of my home would allow. This was an obstacle to engaging in any degree of interactivity as I found myself walking into walls and flower beds, and almost walking into traffic in my attempt to find the virtual game objects. Concern for my own safety became of primary importance, while collecting game objects became a distant second. From the perspective of immersion this game was not successful, nor did I find it successful or enjoyable with regard to interactivity. Sound seemed to function as merely a feedback mechanism to my haptic interaction with the screen and was almost indistinguishable from a video game with an added sound component. If I had been able to physically move around in a large and safe area to collect more game objects perhaps the locative component would have elevated the interactive nature of the experience.

³³ A *boss* is a computer controlled enemy within a video game narrative. There are typically various levels of *bosses* that the player must encounter before challenging the final *boss* in the highest game level.

³⁴ *Asteroids* is an arcade game released by Atari in 1979.

Although *Sound Swallower* bears similarities to some of my own locative sound projects with regard to its use of walking path and GPS hotspots, my own work does not include elements typically associated with games such as collecting items and interacting with virtual objects that have visual representations. The difficulty that I experienced while playing *Sound Swallower* helped to inform the design and deployment of my own projects with regard to the careful planning of the user's walking route with attention paid to physical obstacles and dangers, as well as the potential for visual and auditory distractions and impediments to an engaging user experience. The challenges that I faced while playing *Sound Swallower* also provided a valuable learning opportunity with regard to maximizing the IRL environment within the experience in order to maximize the potential for hybridity. Knowledge of real world physical elements (graffiti wall, park bench, monument, traffic signal) along the route informed my choice of hotspot placements when designing *Thing of Shapes to Come* for exhibition in Galway. Knowing that a traffic signal at a particular intersection in Montreal also had an audible signal that sounded a bit like a bird chipping, informed my decision to deploy an audio piece in which there was the mention of birds. A location on the University of Ireland campus in Galway where the River Corrib was damned provided an excellent location for an audio piece in which water was featured prominently. Incorporating real world elements, that were unavoidable along the route, into the project deployment added a kind of ambient layer of synchronicity to the XR sound experience, heightening the hybrid nature of the experience.

H__R

Created by RJDJ, the product website for H__R promises to give the user unlimited control over real world sound and contains testimonials comparing the experience of using the app to that of hallucinogenic drugs (Hear the World Your Way, 2019). The company philosophy makes the claim that headphones will soon be worn throughout the day and night and that they will “connect us with the virtual world and keep us in our communication streams with family, friends and business” (ibid). This itself is a concerning, if not frightening, potential future; like something straight out of a sci-fi film.

The final promise of the company philosophy is that *hearables*³⁵ of the future “will connect us to the real world and enhance and augment our perception of the real world” (Hear the World Your Way, 2019). This final element of their product philosophy aligns nicely with my general theme in this dissertation of ‘listening through technology’ and the idea of a ‘hybrid aurality practice’.

The experience of using this app did not feel like interaction until I began to put my thoughts into writing and realized that it had been the most interactive of all apps that I analyzed. My preconception about interaction was that it required voluntary actions by the user that would, in turn, generate a feedback event from the software. For example, the user taps the screen to move their avatar forward within the game space, and the avatar moves forward making corresponding sounds (footsteps, etc.) and encountering game generated characters and objects. In H__R, the input data was mostly composed of ambient and environmental sound events, and those that were user-generated were mostly involuntary, e.g. breathing, rustling of clothing, movement, etc. The interaction could be characterized as *ambient interaction*; “interaction in which the natural movement of people such as gestures trigger the environment to respond” (Sommerer, Jain, and Mignonneau 2008). In this case, it would more accurately be called *hybrid ambient interaction* because the *real* movement triggers a response within the

³⁵ The H__R app website claims, in their company philosophy, that “headphones will increasingly be equipped with sensory hardware and evolve into hearables” (Hear the World Your Way, 2019).

parallel digital or virtual environment. In hindsight and with more in-depth post experience analysis I would characterize *H__R* app as a highly successful immersive interactive app which successfully satisfied the metrics of sensorial heterotopia and acousmatic anxiety.

Polyfauna

Created by the alternative rock band, Radiohead, artist Stanley Donwood, Radiohead producer Nigel Godrich, and digital art and design collective Universal Everything, *Polyfauna* immerses the user in an environment that engages through visualizations to be experienced spatially, as the user navigates a crude futuristic digital landscape accompanied by the music of Radiohead. None of the musical pieces that I heard were complete compositions by the band; rather, they were musical sketches that suited the onscreen visual environment. Due to the fact that the visual component seemed to be essential to full engagement within the experience, I would not consider this a sound-only experience. The use of binaural sound and interactive spatial visualizations created a comprehensive and engaging experience that would inform elements of my creative practice. I would say that *Polyfauna* could be considered a successful immersive interactive app.

Because I am a huge fan of Radiohead, *Polyfauna* was by far the app that I was most excited to try. Although I did not feel the satisfaction with *Polyfauna* that I had expected, it did provide some valuable lessons about sound in XR. The use of interaction between sound and visual was interesting, as if each was reacting to the other in a dynamic way. When a visual element would appear in a new area of the iPhone screen, a corresponding (binaural) sound would be heard in the corresponding area of auditory space. This use of binaural sound in relation to the visual elements seemed to heighten my awareness of both in-game and IRL

environment. This informed my own creative decisions about ways of directing the user's attention to specific IRL objects and locations through the use of binaural sound cues. The use of binaural sound as a sort of auditory pointing stick became a useful tool in my own creative projects including locative listening podcasts, locative media, and VR projects.

Inception

Created by Hans Zimmer and Christopher Nolan, composer and director of the *Inception* film respectively, and Michael Breidenbruecker, co-founder of "Reactive Music" app developer RJDJ, the *Inception* app is based on the film by the same name. The film narrative follows Cobb, a professional thief played by Leonardo DiCaprio, who is able to steal information from individuals by entering their subconscious minds during the dream state. The app plays heavily on the dislocation of senses one might expect while dreaming. Sound input from the device microphone is exaggerated and manipulated with various degrees of reverb and pitch shifting and is blended with music score from the film, environmental/foley sounds such as waves lapping on a beach and seagulls. These sounds, in particular, make sonic reference to scenes in the film in which Cobb is in someone's dream but allows his own memories of his late wife to enter the dream experience. Although this contextual knowledge has little if any bearing on the level of immersion or comprehensiveness of experience, it provides a deep and meaningful connection between the app and the film.

With 13 game levels to explore, the user can only enter the next dream level upon completion of the previous level, much like typical gameplay. The *Inception* app provided layered and varied stages wherein the experiences were mostly dependent on the user's

imagination and willingness to submit to the sonic immersion. Sensorial heterotopia was achieved through specific instructions for drama stages, i.e., “Airport Dream” that is intended to be experienced while at an airport waiting for a flight, “Travelling Dream” that is to be experienced while travelling fast, “Sunshine Dream” to be experienced on a sunny day. Upon completion of each stage, the user is rewarded with an audio piece of music composed by Hans Zimmer that was either specifically composed for the app or an unreleased piece of music composed for the film. *Inception* was a deeply immersive experience. As was the case with *H__R*, I would say that *Inception* is an excellent example of ambient interaction. *Inception* provided a much deeper level of immersion for me than *H__R*, which I would attribute to the cinematic nature of the experience that included the music score and the association with the narrative of the Christopher Nolan film with which I am quite familiar.

Of the apps that were discussed in this section, *Inception* is the one that is most closely related to my area of interest and creative practice due to its reliance on narrative. Although there were valuable lessons learned from my critical user experience with every app discussed, some were lessons in what I should incorporate into my creative practice, while others were warnings about aspects of user experience to avoid due to their ineffectual nature within my in-game experience.

Summary of App Analysis

While all of the apps discussed in the preceding section use sound as their primary source of sensorial engagement some are more effective in enacting a meaningful sonic experience. *H__R* and *Inception* are the only two that attempt to enact a hybrid experience, although both do so

by using IRL sound as input that is manipulated and redelivered to the user in the form of special effects applied to IRL sound. Although I would consider this a form of hybrid listening it does not allow the user to attend IRL sound in its original state. In one way perhaps this could enable a heightened form of listening in which the user is keenly focused on the manipulated soundscape with a goal of identifying the original source of these highly processed sounds. In doing so they may also create sounds and utterances in order to explore this hybrid sound-making experience as a kind of interactive art experience in which the user is both audience and performer with the technology functioning as creative collaborator. This observation and proposal leads to the following section that investigates the notion of app as art.

Sound app as sound art

...video games, in particular, might be understood as the work of artists who skillfully write beautiful code on the constrained canvas of a particular platform, who design experiences that provoke complex thoughts and actions from their audiences, or who merge existing art forms (music, illustration, acting, and more) into a novel expression of humanity.

(Mellisimos 2015)

In 2012 MoMA (Museum of Modern Art) in New York City announced that it had acquired 14 video games to add to its permanent collection. This announcement caused quite a commotion within the art world, particularly among art critics, many of whom questioned whether video games were actually art. MoMA curator, Paola Antonelli, responded to the criticism by saying “The games were selected as outstanding examples of interaction design” (Maeda 2012). In the summer of 2015, I visited New York City and spent a day at MoMA where my 10-year-old son had the opportunity to play one of the exhibits. On display was *Long March: Restart* by Feng

Mengbo, a video game that, unlike mobile games, occupies two opposing walls of a long exhibition hall with each wall being 20' tall and 80' long. The user plays the games with a standard PlayStation game controller but unlike a typical video game where the user can, for the majority of games, be seated on a couch looking at a television screen, for *Long March: Restart* the user must move around the long exhibition to follow the movement of his in-game avatar along the 80' span before turning to face the opposite wall and continuing in the opposite direction only to repeat this process, assuming that he is successful in his gameplay. The scale of this piece seemed to be the key to immersive interaction, as my son seemed lost in the experience, even more so than an adolescent boy typically is when playing a video game, although he was self-conscious of playing/performing on such a large scale and in an art gallery no less. The performative nature of the game was perhaps an integral element of the experience that transformed simple gameplay into a performance piece.

I agree with *MoMA*'s decision to include video games in their collection, but I would like to argue that some apps could be considered more than "outstanding examples of interaction design." I argue that some of the apps that I analyzed should be considered "interactive art pieces" as they engage the audience, although a single individual at a time, in a meaningful way and can, in some cases, provide the opportunity for deep, inward reflection. It is beyond the scope of this chapter to explore definitions of art, whatever that may be, but I raise this question as a valuable avenue for my future research, both academically and artistically.

Sonic Cartography

Through the deployment of geotagging, these visualities are geotemporally linked to locations. In these overlays, the social is linked to the electronic, and the geographic to the temporal — giving way to new forms of media and mediated “cartographies” that impact an experience of a locality.

(Hjorth 2015:23)

Place-making via sonification and participatory sound projects

As of June 2016, there were 2 million iOS apps available for download from the iTunes Store and 2.2 million Android apps available on the Google Play Store. 1.18% of all apps on the iTunes Store are categorized as “Navigation” (statista.com), although this does not strictly include GPS enabled apps such as games, photography, social media, etc. that are GPS enabled but where the navigation feature is not the primary function of the app. As a form of entertainment, navigation is not very entertaining. Location becomes something more than practical for the user when other features are made available. The ability to find a less congested driving route, nearest parking lot, or next transit departure, although useful, are not entertaining or distracting. The ability to locate friends in a real (currently at the location) or ambient way (having been at the location and geotagged it with a photo, video, etc.) creates an additional layer beyond the current reality that makes the navigation function compelling beyond simply fulfilling a practical need. “Location is not compelling (until it is haunted)” (Sample 2014). The “haunting,” in the case of the ambient media, is significant to this chapter in that it is arguably a form of augmented or alternate reality. The geo-tagged location functions as an *afterimage* or ghost of an event that took place on the exact spot where the user is standing with his GPS-enabled mobile device. The location, paired with the mobile device, becomes a mediator for the

AR or AltR experience, in which case the location is essential to the experience.

Although a sense of place and intimacy has always been mediated by language, memories, and gestures, it is the way in which it is being mediated that is transforming how we think about and experience a location and its relationship to intimacy. (Hjorth 2015:25)

In Chapter 5, I discuss a variety of art projects whose primary mode of engagement is sound. Of particular interest to this dissertation are the artistic projects that use sound in combination with location. In all of the cases discussed in the following chapter, the artistic projects are intended to be experienced at a particular location, in which case their elements are tethered to GPS coordinates and can only be heard when standing at that precise location. Although these projects are location specific, they are not always about that particular location's place or time. In some cases, the narrative elements of the piece describe a place that is in some ways consistent with the location at which the user is standing, while in others both the place and time are presented in juxtaposition to the real *insitu* experience of the user at the time of listening. It is this hybridity that enables the sensorial heterotopia discussed earlier in this chapter; a concept that I will continue to address throughout this dissertation as it is a desired user experiential outcome for much of my creative practice.

Not to be immersed in the sound, as much as to be immersed in the listening

Imagine that you have arrived at a professional conference for your field of work. You enter the lobby to grab a cup of coffee and a danish, collect your name tag, conference schedule, and other documents. You then continue into a large exhibitor hall. Although on this day it is home to many

dozens of booths set up by individuals and companies to promote their products to your field of business, next weekend it could just as easily be the reception hall for a 500 guest wedding. As you walk around the 100,000 square foot exhibitor hall your eyes move in every direction, taking in the expanse of the room and the endless array of products intended to help you do your job more effectively. Suddenly you become acutely aware that for the past several minutes you have been immersed in sound, but have not been listening. This experience is one that, were we to think about it, would be all too familiar to many of us.

We are always *immersed in sound*, but rarely are we *immersed in listening*. If I am wearing earbuds while walking or riding transit, even though the sound is being “injected” directly into my ears, I am rarely fully engaged in listening. This is due to my own lack of focus on the current moment and the tendency of my thoughts to wander to upcoming events, obligations, what I will make for dinner, etc. When I am focused on the moment while listening to certain pieces of music or narrative, the sonic immersion can be quite deep and emotionally evocative sometimes causing me to experience *frisson* (chills or goosebumps as a result of sensory stimuli).

Chapter Summary

Mobile devices offer the experience of *viewership as intimacy* — as if the delivered content is there just for me. It will be interesting to see how content creators use this delivery channel in the coming years. Will storytellers, utilizing traditional film and other forms, embrace the uniqueness of small-scale mobile viewership and how, not if, will new forms of storytelling develop as a result? How will the music industry or independent music artists use this

technology? Will artists and record labels use their apps to release albums or singles to their fans? Perhaps on a specific day or at a specific location? Perhaps with a temporal limit of availability? All of these content delivery methods give the end user the sense that they are exceptional— as they receive *their* message on *their* personal device instead of a screen or billboard viewed by a large audience.

With the merging of the PDA (personal digital assistant) and the mobile phone, the smartphone was born, and the mobile phone transformed itself from a tool of *aurality* to one of *visuality*. When AR becomes a commonplace function for users, the mobile device will undergo another transformation, this time from a tool of *visuality* to one of *virtuality*. However, how will sound play into this new paradigm of mobile connectedness? I believe that the birth of mobile virtuality will bring a rebirth for mobile aurality. Once users have played a dozen or more mobile AR games that require them to look at their screen while navigating real space, I argue that they, and app developers, will begin to realize the power of sound within this experience. I posit that mobile app developers will begin to create AR apps that utilize sound in many of the ways that I have addressed in this chapter (binaural sound, acousmatic anxiety, sensorial heterotopia) in order to achieve a more comprehensive user experience without needing to create additional visual AR content. If this newfound aurality, as a result of mobile virtuality, does come to pass I believe that mobile sound will begin to have the same degree of significance for users as cinematic sound currently does for audiences. Just as we could not imagine a trip to the movie theatre without the *THX*³⁶ multi-channel surround sound experience, we can expect that similar

³⁶ *THX* is not a sound format but a system for achieving a high-quality sound experience that includes specificity concerning audio and video equipment, screening room design and construction materials.

attention to detail will become standard practice when designing mobile apps. The intimacy of mobile device viewership offers a possibility that is unique to mobile — binaural sound.

Although surround sound is used in movie theatres, the sonic plausibility it delivers is weak when compared to the same sounds being injected directly into your ears. Not to mention that it is your own private experience, and you can take it *to go*.

Pokémon Go

On July 6 of 2016 *Pokémon Go* was released in the United States, Australia, and New Zealand, and the following week in 26 more countries, although it had yet to be released in Canada. This mobile app was perhaps the first augmented reality app ever released that had the potential for mass appeal. The response to *Pokémon Go* was overwhelming, and a bit concerning for some. The popularity of the app caused servers to crash on numerous occasions, and the near-blind devotion to the experience of searching the real world for the virtual game characters led individuals to get lost at night, walk into traffic, put themselves in vulnerable and dangerous situations, and a woman in Wyoming even “stumbled upon a dead body while trying to reach a water-type Pokemon apparently living in a river by her trailer” (Hern 2016). This mobile game provides an interesting and useful model for AR design as well as a study in the potential pitfalls of flawed user experience design.

Pokémon Go serves as a useful reference for this research project. Due to its widespread user adoption (although short-lived), novel use of location-aware media, AR, and social user experience, I argue that the *Pokémon Go* phenomenon provides a great deal of valuable research material related to this project. Although this dissertation is not about *Pokémon Go* the mobile

app does provide a useful reference when examining user engagement with mobile AR and location-aware media and user experience of shared virtually embodied space. Because it does not use sound as a significant sensorial mode of user engagement *Pokémon Go* is not discussed in the chapter that follows this one. However, the game and its functionality will serve as a constant reminder of what an engaging, and perhaps addictive, mobile AR experience looks like from both the perspective of single-player and social multi-player experience.

The analysis of sound-based mobile apps undertaken in this chapter revealed functionality strengths and weaknesses of currently available apps and resultantly will provide valuable context for further explorations of technologically mediated sound environments as well as providing reference points during the development of my own sound-based creative projects. Perhaps the key take-away from this close-reading of sound-based mobile apps is that these environments and experiences are most affective when they commit to being sound-based and do not rely on the use of visuals for guidance or haptic interaction response. I argue that when the user is allowed to enter a sound environment without the need to engage other senses, hearing is given primacy. This sound-only type of experience is rarely possible in XR environments, perhaps due to the expectations of the audience and the fact that it would not fully utilize the technology associated with these experiences. In the chapter that follows I will further explore the issue of sound-based XR experiences through a discussion of a variety projects that use sound as a meaningful element of immersion and hybridity. Some of these projects require the user to travel a specific route IRL with a data-enabled smartphone, while others require little more than an internet-enabled device, a pair of earbuds, a chair, and an open mind.

Chapter 5

A Sound Practice

Introduction

This chapter considers creative practice as research, in which sound-based location-aware media projects function as experiments and explorations with a goal of contributing to theoretical knowledge. A discussion of sound art projects by several artists as well as projects of my own creation is undertaken as a means to better understand the existing scope of sound-based artwork as well as exploring potential directions in this art form. As mobile technologies continue to pervade our every day, my particular interest in sound art projects is one that uses the smartphone as the primary mode of engagement. The reason for my interest in a technologically enabled form of creation is twofold; the ubiquity of the smartphone³⁷ and my interest in the hybrid experiences that are made possible when delivering content to a mobile device such as a smartphone. The ubiquity of the smartphone also provides affordances for artistic experience that, rather than requiring the user to go to specific places to experience the work, allow the user to take the artwork with them and experience it in a prescribed “type” of location or situation, or in any location or situation of their own choosing.

This form of artistic practice could also be referred to as “insitu” art. Although the term is often thought to be interchangeable with “site-specific” art, the form that I am exploring differs in that it is not always created for a specific location nor does it always need to be experienced at a specific location. Nonetheless, I argue that it can be considered as insitu art due to the fact that

³⁷ As of January 2018, 77% of adults in the United States owned a smartphone. (“US Smartphone Ownership 2011-2018 | Statista.” *Statista*, www.statista.com/statistics/219865/percentage-of-us-adults-who-own-a-smartphone/.)

location and/or setting play an integral role in the user experience. With some of my own *Locative Listening* pieces the user is instructed to experience the episode in a prescribed setting (sitting at a kitchen table, in a busy public place, etc.) although being at a precise location is not necessary. In fact, the hybrid experience is often enriched by listening in a type of location that is different from the one where the piece, or portion of the piece, was recorded. The kind of subtle and often indiscernible layering of sonic experience that is of interest to me in my own creative work is referred to by Jean-Paul Thibaud as “impregnation.” He characterizes this kind of listening as a “discrete, pervasive and durable mode of action by which ambience takes effect” (Thibaud, 2017). These subtle listening elements that often go consciously unnoticed are not unimportant as they can inform our experience of place and situation before the other senses are even alerted to the existence of the place or setting. Due to the fact that sounds can reach our awareness in a dark room or from around a corner, hearing can be the first sense to be engaged and in turn it can initiate the experience of place.

Locative Listening and the Construction of Dynamic Hybrid Space

The use of sound-based technologies has changed the search for silence into a search for noise. (Bull 2007: 7)

When the contemporary pedestrian travels from home to work, campus, or coffee shop wearing earphones and listening to a mobile device, he is not trying to find silent refuge from the noise of modern life; rather, he is striving to replace one sonic environment with another of his own choosing. Sonic experience is unique in that it is the only one of our senses that we can effectively, and safely, restrict or subvert in this way. One would find it very difficult to achieve a

similar sensorial subversion with any of the other senses, particularly while moving through public space. To replace the visual experience with another would make it impossible to move safely through a busy public space. The subversion of the olfactory could be revolting or pleasing, gustatory subversion happens every time we walk and sip our coffee or Coke, and somatic subversion would be difficult to achieve in a meaningful way without a full body suit loaded with digital sensors and stimulators. Sound, I will argue, is unique in its ease of subversion and the degree of experiential immersion that can be achieved through such an act. The nature of listening that I will discuss in this chapter is one that by way of design takes the mobile listening activity to a much more structured level of auditory experience with the hope of eliciting an event that is multi-sensory and potent.

Pervasive Digital Media and the Birth of Hybrid Space

Throughout history, when a medium that was once understood as geographically fixed becomes mobile, a cultural shift accompanies the transformation. (Farnam 2012: 2)

As defined by the Director of the Mobile Gaming Research Lab at North Carolina State University, Adriana de Souza e Silva, hybrid space is characterized as “social spaces created by the combination of physical space with digital information and the mobility of users equipped with location-aware interfaces” (DeSouza 2006: 179). The sort of hybrid space described by de Souza e Silva is one that a decade ago could not have existed. The advent of the Apple iPhone ushered in an era of connectivity that inhabitants of a pre-smartphone world, excluding sci-fi enthusiasts, may never have imagined. Although there were antecedent smartphone technologies, it was the multi-touch screen of the iPhone, and, shortly thereafter, Android-based devices, that

brought the smartphone to the masses. While the smartphone has allowed for the sharing of photos, videos, and location data, the mobile phone allowed individuals, untethered, to speak to one another, and shortly thereafter to text one another, while moving through space, citizens band radio (CB) allowed users to speak while traveling in vehicles decades ago. Telegraphy, the printed novel, and even smoke signals created versions of hybrid space due to the respective dimensions of semiotic content within the information being transmitted and the mobility or distance across which the messages could be received. It would appear that versions of hybrid space have been with us for a very long time.

It could be said that the printed novel became the walkman, eventually merging with the mobile phone to create the smartphone. While the first three could be characterized as isolating technologies that provide varying degrees of immersion, the smartphone is perhaps the only one that has the potential to provide immersive and comprehensive experiences, not to mention the capability to share the immersion with others through social networks. The pervasiveness of modern mobile technologies presents countless opportunities for connection and disconnection alike. While social media allow individuals to stay connected with friends and family who are not in the same location, it is precisely this act of connection that creates a disconnect from their current, real situation. Just as an individual cannot truly be in two places at once, their attention cannot be fully invested in the real moment while at the same time engaged in a virtual exchange via texting, social media, or voice call. The act of splitting the sensorium between the real and the virtual experience is what creates the type of hybrid space that is of particular interest to me.

While de Souza e Silva's definition explicitly defines hybrid space as one that requires location-aware technology, I will explore a broader, perhaps more fundamental, definition of the

term. The most basic, and the starting point for my investigation of this theme, is one that enlists the work of geographer Yi-Fu Tuan to describe embodiment within the blend of familiar and unfamiliar. The distinction between space and place may be characterized as the experience of being in a location devoid of personal, cultural or historical meaning in contrast to a location embedded with those attributes. I argue that sound can be a bridge that straddles these two diametrically opposed experiences creating a multi-sensory experience for the end user that observes both experiences without completely ignoring one or the other. This manufactured experiential landscape is one that inhabits the area between what geographers refer to as *space* and *place*, not a meaningless location or path, while at the same time, not one imbued with real-world, actual meaning. Yi-Fu Tuan clearly articulates the distinction between these two ideas in the introduction to “Space and Place: the perspective of experience.” “In experience, the meaning of space often merges with that of place. Space is more abstract than place. What begins as undifferentiated space becomes place as we get to know it better and endow it with value.” (Tuan 1977: 6)

Dynamic Hybrid Space

While my exploration of *hybrid space* is concerned with the split between the real and the virtual, *dynamic hybrid space* introduces observations of the ways in which temporality exerts a very strong influence upon the experience. It is hybrid in that it is composed of two primary elements; the real; visual, vestibular, auditory, olfactory, and haptic stimuli, and the virtual; technologically-mediated listening experience. The term “dynamic” is used as a means of expressing the ephemeral nature of this form of listening. Unlike a music video, film, or other

amalgamation of sound and moving image, this type of experience, no matter how carefully planned, is an ever-changing occurrence. Even if the listener chooses the same playlist and the same route through physical space, the surroundings will never be the same on subsequent walks. This source of variety within *sameness* is what makes locative listening of particular interest to me as a form of entertainment. Although the path and its fixed features may be constant, human activity, weather and other natural elements will force the experience to vary from one instance to another. Multiple listens to the same piece along the same route can make for very different experiences for the user. Because locative listening experiences are designed with situational specificity in mind, the slight deviations in real sensory input have the potential to greatly affect the hybrid sensorial experience. The interplay that occurs between the real and the virtual is precisely what I intend to explore, and in doing so, I will assert that, under specific conditions, the locative listener can experience a transcendent sensorial immersion.

Locative Listening as Virtual Embodiment

As we move through our days engaged in the familiar (interacting with friends and family, eating meals, dressing) and the not so familiar (watching a breaking news story on television, having a disagreement with a stranger, reading a new book), the awareness of our unique experience is something that we take for granted. Rarely do we stop to intellectualize the degrees of perception experienced in the moment or how they affect our various senses, nor do we observe our surroundings in an analytic way to recognize our proprioceptive state. This prosaic experience of affect is one that can be heightened when the real and the virtual collide.

The disconnect between real and virtual experience enables a sort of *virtual embodiment*. As defined by Paul Dourish “Embodied phenomena are those that by their very nature occur in real time and real space” (Dourish 2004: 101). This definition of embodiment is only half fulfilled by the type of semiotic exchange enabled by pervasive digital media. Without exception, I would say that the use of digital media enacts a state of virtual embodiment. Unlike that which is experienced while playing a first-person shooter game or the online virtual world of *Second Life* in which the user is fully aware of their entrance into the virtual, pervasive digital media creates a sort of involuntary and, for the most part, unconscious virtual embodiment. During this embodiment, the awareness of the boundary that separates real from virtual is hidden from the user by the attenuation of the various senses, as a push and pull occurs between the real and the virtual. Listening to the voice on the other end of the telephone call, texting, or reading tweets and Facebook posts make the user less aware of their real surroundings unless these events in some way (seeing someone familiar, witnessing a sight or event of interest, volume of speech, content of conversation) create a momentary distraction from the virtual, in turn bringing the user back to the real, if only for a moment.

Virtual embodiment is not new, as similar observations could be made with regard to someone sitting on a park bench reading a novel. The difference is that when we walk down a city street or ride on public transit, we can witness crowds of the virtually embodied. Never here nor there, but always somewhere in between. Locative listening presents the opportunity for an experience that more closely resembles that of the person sitting on a park bench reading a novel than of the subway tweeter. The novel reader is immersed in an experience that exists only between the covers of his book, taking in information that is translated via his imagination to

create an internally constructed sensorium for his own personal experience. While the social media user who is scrolling through tweets and posts may be immersed in the act of experience of receiving information, they are rarely immersed in the *matter* of the experience. Locative listening enables an experience that is at once an immersion into the virtual while at the same time inviting a transcendent experience due to the often indistinguishable overlaps between real and virtual.

Mobile Listening

Since the advent of the Sony Walkman, many have chosen to neglect their real sonic environment in favour of, for the vast majority of individuals, a musical soundtrack. The virtual sound envelopes the listener and can remove him from the real sonic experience, although it rarely creates the feeling of a virtual experience. It functions more like wearing a sleep mask for the auditory sense, dulling the real sounds in favour of music, podcast, etc. The endowment of value that Tuan states as being a key distinction between space and place is one that can never truly exist for the mobile listener, as he is never fully in any place. The mobile listener is always moving through space and in doing so is distancing himself not only from individuals, but also every other element of his real space; buildings, cars, flora, fauna, and the situational specifics of each potential place. The listening becomes a soundtrack of transience rather than one of moments and memories; thus the aural experience is detached from the other stimuli that make up his sensorium. The space created typically becomes one using a generic soundtrack that can be easily repurposed for the transit ride home from work or a walk in the park without much change in meaning for the listener. The real experience functions merely as a canvas upon which

the virtual (sound) is projected but contributes little to the overall sensorium, and would likely be characterized by the mobile listener as a means of blocking out the nuisance of everyday sounds. Within a locative listening experience the seeming randomness of real “nuisance” sounds, which is precisely what makes them a nuisance, is as vital to the overall experience as the intentionally designed virtual sounds of the locative listening piece.

Mobile Listening as Private Public Space

Being in a public space while engaged in personal activity can be characterized as *public private space*, another form of what I will characterize as hybrid space. An individual can have a very personal telephone conversation, and I have overheard many that I wish I could un-hear, while on public transit, or a heated text message exchange that if verbalized would cause those nearby to recoil with discomfort. The discrete nature of mobile technology and the communication that it makes possible allow us to exercise great degrees of privacy even in the most public of places. Listening to music, an audiobook, or podcast, although unidirectional, unlike phone conversations or texting, allow for similar privatization of public space. It would be hard to imagine a similar private experience of the purely visual. A public transit rider watching a *Youtube* video on their smartphone would almost certainly attract at least a casual glance from his seat mate. Mobile listening for the most part enacts a state of “technologically-mediated solitude” in which “we are increasingly alone together” (Bull, 2005:5). Sound can be concealed.

Locative Listening

The term “locative listening” is used in this chapter to describe the specific technologically-mediated listening that I am exploring in this study and is not to be considered interchangeable with the term “mobile listening.” A mobile listener uses an iPod or another mobile device to play audio content (music, podcast, audiobook) to accompany their activities, but their listening experience is, for the most part, independent of their other senses. Mobile listening is not dependent upon location or movement as the aural experience, I would suggest, is not intended to be anything more than an extension of an AM radio droning in the background as someone performs tedious tasks in the home or workplace. Just as a sleep mask is worn to block unwanted light, earphones for the Walkman, iPod, and other mobile technology create the sonic equivalent of this form of sensory deprivation. The obvious deviation from pure sensory deprivation is that the aural experience for the mobile listener is not muted, but exchanged for another of his own choosing. This “accompanied solitude” (Bull 2007) simultaneously attempts to separate us from our real experience and connect us to the sonic accompaniment of our choosing. In doing so the mobile listener is isolated from the real sonic world, but never alone.

Locative listening stands in stark contrast to mobile listening in that in the case of locative listening; location plays an integral part in the listening experience. Additionally, the reader should not be confused by the use of the term “locative” to describe this listening activity as one that requires movement. The term “locative” refers to location specificity, and not the act of moving from location to location, as a necessity for the type of listening that I am exploring within this chapter. Some of this sort of listening requires no movement at all, in fact, some of the listening pieces are intended as stationary listening activities to be experienced in situations

that fall within a specific set of parameters. i.e., solitary setting, busy public setting, while seated and eating a meal alone at home, etc. This sort of situational specificity is perhaps what makes locative listening truly unique and also quite prohibitive for the uncommitted user. While mobile listening requires the user to choose any soundtrack that they desire, locative listening prescribes a specific soundtrack for a specific activity. One can think of these parameters as scene descriptions in a script and adhering to these parameters will more closely create the setting that the sound piece creator had in mind for the end user.

Locative Listening as Subtle Virtual Reality Experience

The type of the locative listening that I am exploring in this study is one that, rather than using pop song playlists as the soundtrack, employs binaural audio recorded at different geographic sites from that of the end user's listening experience; archival, fictional, and/or a combination of the two created for specific geographic sites or for unspecified sites with predetermined duration of listening experience. The soundtrack is listened to by the user within his own real sensorial environment, thus creating a sonic overlay that has the potential to substantially alter the sensorial experience. Locative listening allows for a type of immersion that I will refer to as a "subtle virtual reality experience." Although the setting and technological mediation may be unremarkable when compared to virtual reality or augmented reality, the degree of potential immersion is no less comprehensive and can be awe-inspiring in a way that 3D models and digital landscapes viewed through *Oculus* goggles are less likely to be for the user. The nature of listening is one that allows the user to lose himself in the experience without fear of disorientation or lack of understanding with regard to interface functionality or haptic

unpredictability. Admittedly, augmented reality and virtual reality interfaces are nascent technologies, while the simplicity of pre-recorded sound is unexceptional as a technological mediation, but perhaps this simplicity is precisely what makes the degree of immersion all the more surprising.

Augmented Reality & Augmented Aurality

I began to explore augmented reality in 2013 as a student in Caitlin Fisher's Future Cinema class in the York University Film Department. Through readings and practical assignments, I was challenged to re-think what I knew about storytelling and to envision potential future(s) of storytelling. For my final assignment, I decided to work with a group of classmates to create an augmented reality project for iOS. The piece was called *Vessels of Memory*, and it was a piece that explored an archive of items owned by a recently deceased resident of Toronto. By creating an iPad interface using video game design software program called *Unity*, I created augmented reality overlays that the user experienced when looking at the items through the iPad screen.

These overlays included: sound design, original score, video clips, and digital animations to tell a story that was part archival and part fiction. The result was an evocative story of gender, cultural expectation, loss, seduction and deceit. This piece was exhibited at HASTAC (Humanities, Arts, Science, and Technology Alliance and Collaboratory) 2013 at York University to a very warm reception. My next project was *Mother|Home|Heaven*, a collaboration with Dr. Caitlin Fisher for LandSlide Possible Futures in 2014, curated by Dr. Janine Marchessault. For this piece, we used the artifacts in a recreated early 20th-century general store in Markham, Ontario as the "markers" for the AR experience. This project was much more extensive with

dozens of markers throughout the general store that the user could use as various entry points into a story that was, once again, a fictional/archival narrative, based on real diary entries by Markham residents from the mid 19th to mid 20th century. I decided that I wanted sound to play a much more prominent role in this project and I composed several musical and sound pieces as standalone experiences and others to accompany various videos, digital animations and layered visual effects. This piece was exhibited for the duration of the Markham show and went on to be exhibited at Lydgalleriet as part of the ELO (Electronic Literature Organization) 2015 conference in Bergen, Norway where it was met with a great deal of excitement by other conference artists and presenters as well as gallery visitors. I had the opportunity to be on site for several days and was able to speak to many visitors before and after they experienced the piece to answer questions about the technology and the process. Those few days in Bergen were invaluable as encouragement with regard to the power of this technology and the role that sound played within the experience.

Having composed original music scores and soundscapes for a variety of media as well as absolute music, I thought of myself as a *sonic storyteller*. I have for a very long time been acutely aware of the power of music and sound to elevate a cinematic moment, and in some cases save a scene from disaster. While at the same time the use of silence is equally powerful and knowing when to utilize one or the other has the potential to make or break a moment. These “moments” were carefully constructed linear narratives that allowed the viewer an “authentic passive experience” with no need for engagement beyond basic awareness. Interactive media was the next step in composing in a slightly unconventional way when compared to my past work. In 2001 I was hired by *Big Orbit Media* to create music tracks for a web portal called

“bekool.ca” that they were creating for *Kraft Foods*, specifically for the *Kool-Aid* brand. The portal had several sections where children could play games, colour, and make music. My task was to create a variety of songs, each of which would be de-constructed and mashed up by site visitors. It was essentially *Garage Band* by *Apple* before *Garage Band* by *Apple* existed. This gig posed an interesting challenge for me and was something that I struggled with not only in terms of feasibility but also in philosophical terms. I was charged with creating music that would not resemble any single linear form. The idea of this was confounding.

Looking back at this project I realize now that this is precisely the manner in which I compose music and sound for augmented reality and virtual reality experiences. When I composed music and sound for Caitlin Fisher’s *Oculus* piece, *Cardamom of the Dead*, I approached the process in precisely this way. A series of related virtual rooms within a virtual reality landscape were brought to life with a poetic narrative written and performed by Dr. Fisher, visual elements created by the AR Lab Team, and music and sound composed by me. Sound was a key immersion element within rooms but also between rooms, as the computer required 10 to 20 seconds, depending on the size of the data file, to load the *scene* for the next room that the user chose to enter. Interstitial sound became, dare I say it, a form of *Muzak* for the user as she waited for her next experience to begin. This waiting sound was designed as a sonic stasis to keep the user within the experience instead of becoming aware of their real sonic surroundings as this would remove the user from the immersion and ultimately require time to re-immense within the virtual experience.

Alternate reality typically refers to a type of narrative-based game, commonly referred to as an *ARG* (Alternate Reality Game), where the real world experience is mediated by a sort of

role-playing as the performative element of what can be a multi-layered transmedia game experience. The *ARG* can be as simple as role-playing with instructions printed on cards or as complex as an unfolding narrative that requires the users to call telephone numbers, send and receive text messages or emails, visit websites and real-world locations, and interact with strangers who may or may not be engaged in the gameplay. This type of “low-tech” *mediated-reality* experience began to inform my artistic practice and led me to explore sound and video walks as interactive narratives.

Whereas the goal of virtual reality is to subvert the real experience as much as possible and to replace it with an artificial one, I argue that the intent of the projects that I will discuss in this chapter is to layer the real experience with the virtual. This layering creates hybridity or sensorial heterotopia, enabling a user experience that is at once real and virtual. With the added layer of moving through real physical space, the user is also engaged in a form of “place-making.” Although initiated by the added layer of virtual sound, the entirety of the experience is a result of the user’s complete sensorial engagement with real and virtual, as well as, and perhaps most importantly, the sensorial heterotopia enacted by the knowledge gap presented through the complete sensorial scene in which they find themselves. The knowledge gap refers precisely to the experience of sensorial heterotopia in which the user is at times unaware of the source of the sound being heard, thus creating hybridity that can make these moments feel like scenes in a virtual experience. All of this leads me back to the beginning of my research project and my original reason for choosing to explore the topic of technologically-mediated sound; augmented reality.

Location Aware Hybrid Reality Projects

When I think of works of media art or any art for that matter, I imagine going to an art gallery and looking at a video projection, installation, painting, or sculpture as a spectator who is engaging with the artwork on display as an external experience. The sort of experiences that I explore with location-aware media are intended to engage the user in an intimate and internal way. Because the user is listening to the piece on earphones, the sound is inside their heads as they move about in their outside, external environment. The nature of this sort of work explores ideas of sensorial heterotopia and place-making as the user is at times unaware of the source of the sounds they hear and the location-aware nature of the pieces demand that they are experienced at a particular location. Although I would characterize the projects in this section as insitu art, over time I have come to refer to them as “location-aware” work because in the case of *The Other Side of OZ* and *The Chez* they are triggered by location-specific technologies. In the case of *The Other Side of OZ* the trigger is a QR code, and for *The Chez*, it is as a GPS hotspot. Although the user-experience for *Strathroy Stories* and *Thing of Shapes to Come* is also triggered by GPS hotspots, these projects use not only a layering of real and virtual sound but also a layering of real and virtual place-making. The stories about Strathroy are mapped to similar sites in Galway, Victoria, and Orlando while the *Thing of Shapes to Come* maps the fictional location of the narrative to specific sites in Galway at which the story elements “may” have taken place.

Whereas the goal of virtual reality is to subvert the real experience as much as possible and to replace it with an artificial one, I argue that the intent of the projects that I will discuss in this chapter is to layer the real experience with the virtual. With the added layer of moving through real physical space, the user is also engaged in a form of place-making. Although

initiated by the added layer of virtual sound, the entirety of the experience is a result of the user's complete sensorial engagement with the real and virtual, as well as, and perhaps most importantly, the sensorial heterotopia enacted by the knowledge gap presented through the complete sensorial scene in which they find themselves.

The Other Side of OZ (Part 1 & 2)

This site-specific alternate reality walk uses physical features of James Street North in Hamilton as “stops” on a audio/video walk exploring the mythology and contemporary cultural context of *The Wizard of Oz*³⁸. The experience is triggered via *Youtube* video when the user scans a QR code that is discretely displayed in an art gallery window. The user is then guided by a voice (my own) that directs them along a specified walking path where they encounter (on their smartphone screen) their “virtual guide” who speaks directly to them, sometimes directing them along the path, at other times telling a story or simply watching and following them along the path before suddenly disappearing. *The Other Side of OZ* was released in two instalments in May and June of 2013, each coinciding with a monthly art event called *The James North Art Crawl* which takes place in Hamilton, Ontario on the second Friday of each month. The video was shot at the specific locations where the user is expected to be standing while experiencing the piece. On the night of the events this posed a problem that I had not anticipated, but should have, as the sidewalk is so crowded during monthly art crawls that the user would find it very difficult to navigate the busy pedestrian walkway while paying attention to their smartphone screen for the content. In addition, when the “virtual guide” appears on screen in a crowded situation the effect

³⁸ The narrative of this piece refers specifically to elements of the film directed by Victor Fleming, based on the 1900 children's book by L. Frank Baum.

for the user is not as tenable as if it were experienced in a less crowded setting similar to the one in which it was recorded.

Alter Bahnhof Video Walk

The inspiration for the deployment approach to this piece was *Alter Bahnhof Video Walk*³⁹ by Janet Cardiff and George Bures Miller in which the user borrows an iPod and headphones and follows the pre-recorded instructions of a narrator to explore the interior of a train station. The artist statement below from the cardiffmiller website explains the technical and experiential details for the user.

The Alter Bahnhof Video Walk was designed for the old train station in Kassel, Germany as part of dOCUMENTA (13). Participants are able to borrow an iPod and headphones from a check-out booth. Cardiff and Miller then direct them through the station. An alternate world opens up where reality and fiction meld in a disturbing and uncanny way that has been referred to as "physical cinema." The participants watch things unfold on the small screen but feel the presence of those events deeply because of being situated in the exact location where the footage was shot. As they follow the moving images (and try to frame them as if they were the camera operator), a strange confusion of realities occurs. In this confusion, the past and present conflate and Cardiff and Miller guide us through a meditation on memory and reveal the poignant moments of being alive and present. (cardiffmiller.com)

The first sounds heard by the user are spoken instructions from the recording saying "Okay. Turn the camera on. Press the video button. I'm sitting here right now with you in the train station in Kassel. Watching people pass by. It's very intimate in ways, watching people." This final sentence seems to be a user experience instruction as much as it is a personal reflection. Telling the user that watching people is "very intimate" functioned for me as an

³⁹ Created in 2012 and set in a train station in Kassel, Germany.

invitation to experience the walk in exactly that way. Almost immediately following this statement, an elderly woman passes by, although only in the virtual experience, with a pace and disposition that is a stark contrast to that of the hurried morning commuters who seem almost disconnected from their current place and experience and are focused on getting to where they need to be. The elderly woman walks at a much slower pace and turns to look directly at the user. This image is followed by that of a forest scene and then two young women hurrying past in the opposite direction of the elderly woman. The narrator goes on to say “This video will be an experiment. We’re like these prisoners stuck in Plato’s cave. We watch the flickering shadows on the screen.” This statement refers to a section of Book 7 in *The Republic* by Plato in which Socrates asks Glaucon to imagine a scenario in which prisoners are chained facing a wall within a cave-like structure with a fire burning inside, and their only view on the world outside of the cave is the shadows cast by the light of the fire.

Behold! Human beings living in a underground den, which has a mouth open towards the light and reaching all along the den; here they have been from their childhood, and have their legs and necks chained so that they cannot move, and can only see before them, being prevented by the chains from turning round their heads. Above and behind them a fire is blazing at a distance, and between the fire and the prisoners there is a raised way; and you will see, if you look, a low wall built along the way, like the screen which marionette players have in front of them, over which they show the puppets. (Plato)

My interpretation of Cardiff and Bures Miller’s reference to the cave is twofold: the first being the perspective that the user holding the iPod and viewing reality through its screen is experiencing a technologically-mediated and inaccurate version of reality and in engaging with the virtual version of reality presented on the screen is never fully aware of their true reality,

being that of their experience within the train station. The other perspective that I propose is potentially a commentary on modern life by which the artists are perhaps suggesting that the “real” people moving about within the train station are only partially aware of their true reality because as they are moving through the physical space their minds are not likely invested in their current experience, rather they are likely either thinking about where they are going or where they have come from.

The hybridity of the experience, although I have only ever watched a *Youtube* video walkthrough and have never had the opportunity to hold an iPod while standing in Alter Bahnhof, was what I found particularly interesting in that the user was led through an uninteresting physical space that was layered with video and sound of interesting characters and situations on the iPad screen. The sensorial heterotopia created was particularly effective due to the resonant nature of the train station which created very long echoes of sounds that sometimes originated a considerable distance from the listener with echo sound events being heard in both the real and virtual experience. This piece by Janet Cardiff and George Bures Miller and my own successes and failures with *The Other Side of OZ* would inform the planning and production of the piece that I will discuss in the next section.

The Chez

This GPS-enabled site specific alternate reality walk was commissioned for the *Queerstory*⁴⁰ mobile app and featured at World Pride 2014 in Toronto. Co-created with Dr. Caitlin Fisher, this piece was an archival/fictional narrative exploring the Toronto lesbian bar scene in the 1980s.

⁴⁰ The *Queerstory* app was produced by Year Zero One [YZO], a non-profit media arts organization founded by Toronto artists Michael Alstad and Camille Turner.

For this piece the user would enter the experience when they had the *Queerstory* mobile app launched and had arrived at a GPS hotspot at the southeast corner of Yonge Street and Hayden Street in Toronto, at which point an audio and video piece would guide him along Hayden street for nine minutes, ultimately arriving at the condominium complex that now stands on the location that was once a popular lesbian bar called “The Chez Moi.” The user experience for this piece was much more successful than *The Other Side of OZ* due to the fact that the street being explored as part of the alternate reality walk is not a busy pedestrian thoroughfare. Although the trigger point for the project is the corner of Yonge and Hayden, the contrast between the pedestrian congestion at the starting point and the comparative stillness of the user’s path during the experience and their ultimate endpoint added to the effectiveness of the overall user experience of this piece.

The Chez was screened at ELO 2015 in Bergen, Norway. Although the piece was created as an alternate reality video walk, the conference setting was not conducive to this form of user experience, as *The Chez* is a true site-specific media art project that referenced a specific location and time in Toronto and would not work as well if placed at another location. For the ELO 2015 conference, *The Chez* was screened in a lecture hall, and Caitlin Fisher and I introduced the piece by discussing the narrative, location and site importance, and details regarding challenges related to technical planning and production, after which the room went dark, and the screening began. After the session was over, Caitlin and I discussed our experiences of watching the piece on a large screen with dozens of people who were mostly strangers. We both felt that it was a completely different experience than what we had intended and what we had achieved for the small screen. *The Chez* tells the fictional story of a young woman as she begins to explore her

sexuality and at times includes graphic elements of her sexual explorations with other young women. The video that accompanies these passages of narrative includes layers of video showing women in sexual situations. When viewed on a smartphone screen while walking along a city street these images seem almost impressionistic as they blend and wash with other visual elements and are woven into an experience that blends the real and virtual. But when viewed on a large screen in a darkened room the visuals seemed almost pornographic and made me quite uncomfortable. Caitlin felt the same way. This experience, although awkward and a bit embarrassing, was a watershed moment in my understanding of the intimacy afforded by the handheld screen.

The knowledge of the intimacy afforded by the smartphone began to shape and inform my creative practice as I explored themes and narratives whose exposition in a handheld form would enact as large an experiential world as possible, even though the delivery method was perhaps the smallest exhibition gallery possible. This approach to creative work led me to explore a variety of approaches such as podcast and location-aware sound. The next project that I will discuss is an example of the latter and has become a mainstay of my artistic and media art workshop creation practice.

Strathroy Stories

In June of 2016, I created a locative sound piece for NEXT HORIZONS 2016: Electronic Literature Organization Conference and Media Arts Festival in Victoria, British Columbia called *Strathroy Stories*. This project was a series of personal stories of growing up in a small town in Southern Ontario. For my exhibition, I created a locative sound piece using a mobile app called

Radio Aporee: Miniatures for Mobile,⁴¹ available for both iOS and Android. Using the UVIC campus as a *stand-in* for the real location, users were able to navigate the physical space as a representation of the town of Strathroy, Ontario. By creating GPS hotspots throughout the campus that were situated at key conference sites, I was able to exhibit a series of sonic immersions that allowed users to experience episodes of the piece as they made their way to and from conference lectures and exhibitions. Throughout the conference, they could take in a variety of stories as an assemblage of a small town youth experience. Not having been able to attend the conference, it has been difficult to gauge the degree of immersion for those who experienced the piece, although feedback from Dr. Caitlin Fisher, who attended the conference and experienced several nodes of the piece with other conference attendees, was quite positive. The sound nodes were placed at locations on the campus that I believed would evoke a *real* sensorial experience that would, in some cases, coalesce with the virtual experience, while others were chosen to heighten the sense of *sensorial heterotopia*. *Strathroy Stories* would later be exhibited at Other Codes: The First Galway Digital Initiative Conference in Ireland in May of 2017 and HASTAC 2017 in Orlando, Florida.

Strathroy Stories was conceived as a type of short story told across physical space where the user could only experience each element of the story at a particular location. Unlike a printed novel or podcast that a user can take with them to any location and experience on their own terms, this piece was intended as a type of evanescent narrative that required effort on the part of the user. Naturally, within a conference or media festival setting the attendees are a

⁴¹ App developer, Åsmund Sollihøgda, based in Copenhagen, allowed me developer access to the software platform in order to place GPS hotspots at the conference site while at a remote location.

willing and built-in audience for this sort of experience. In the world outside of academic and artist conferences, this sort of experience would be far less well-received, as I have experienced with previous locative projects such as *The Other Side of OZ*. With the conference and media festival situations, I knew that I would be exhibiting to an interested and engaged audience and made an effort to create not only meaningful narrative pieces, but also a mini sonic world for each narrative piece and to provide cohesion between them. This cohesion was achieved through a variety of techniques that I will describe in the next section.

Narrative Cohesion and Immersion across Physical Space

Sensorium Activation

An important characteristic of *Strathroy Stories*, and later with *Thing of Shapes to Come* is that they demand something of the user beyond simply their attention. These projects, in addition to being sound art pieces, are experiments in place-making. While listening to the sound piece through earphones the user is experiencing hybridity with regard to their experience of sound as they are at times unsure of whether the sounds they are hearing are being generated in their real-world experience or in the pre-recorded virtual world experience. In addition to their sonic experience is their overall sensorial experience. The sounds being heard, real or virtual, become elements of their current sensorial experience. If the narrative refers to an element of the natural or human-constructed physical space, the user may either assume that, or wonder if, what they are listening to is a direct reference to what they are seeing. This sort of user experience is what I have come to refer to as “sensorium activation.” By making the experience of the piece appear to be more than just sonic the user is tricked, in a way, into believing that they are

part of a story that takes place in space and time.

Narrative Overlap

Another way that I attempt to create narrative cohesion and immersion is by having elements of individual narratives overlap in subtle ways. A name, location, or event may be mentioned in passing in one narrative element that is triggered at a particular GPS coordinate, and several stops later that same name, location, or event will be the focus of another narrative element. This experience has the effect of manipulating the user's experience of space and place as they may turn around to look back at sites where they have heard previous narrative elements. While listening to the new story, they are at the same time looking across physical space to a place where a related bit of narrative was experienced, thus bringing their consciousness back to a previously visited site and bridging physical distance through their memory of experience, even though the majority of the experience was in fact virtual; i.e., in their head. Their physical experience is shaped by the virtual sounds being delivered directly into their head via earphones. The realization that this sort of experience could be triggered by sound was another turning point for me in my dissertation research, artistic practice and as an educator.

Thing of Shapes to Come

At the time of writing this chapter I am creating a new location-aware media piece called *Thing of Shapes to Come*. This piece is a new creation specifically for *Transient Topographies: Space and Interface in Digital Literature and Art*, Second Galway Digital Cultures Initiative Conference taking place in Galway, Ireland from April 20-21, 2018. For this piece I created the background

story and end-user experience design and Caitlin Fisher has contributed some original narrative elements to be used at GPS hotspots. This piece is nearly identical to *Strathroy Stories* with regard to its end-user experience in that conference attendees will walk around the National University of Ireland campus with a smartphone app and upon entering a GPS hotspot will hear an element of the piece. This piece does differ from *Strathroy Stories* in design as it is a purely fictional narrative and for this project, I have composed original music for each hotspot narrative element. My approach to this project has been closer to that of composing a collection of musical pieces for an album as each composition is closely tied in mood to a particular narrative hotspot element. Although I have not yet completed the final mix, as I have yet to record the narrative voice-over, my vision for these pieces is that the music and narrative will function as equal components of the final product rather than the music being a background to the spoken word. Perhaps the elements will blend in a similar way to that of words and music in a pop song. This project is another experiment in not only technologically-mediated sound but also in electronic literature.

Locative Listening Podcast

In the process of creating various VR and AR projects I had recorded a great deal of binaural audio that I expected to use merely as soundscape elements, but, in some cases, these pieces became narrative elements. I began to realize that these binaural audio pieces could function as standalone audio experiences. I decided to experiment with this idea by creating a podcast that I called *Locative Listening*. The notion that these audio pieces could be immersive experiences originally occurred to me while sitting in the Oslo airport. The podcast

didactic shown in the iTunes page is included below:

These binaural recordings are experiments in a sort of lo-fi augmented reality sound and are best experienced with earbuds/pods rather than over ear noise-cancelling headphones. Listen in a familiar or unfamiliar setting. Be aware of the real sound and the virtual sound, and how the border between the two can sometimes become blurred. These listening pieces can be experienced as just that, "listening pieces" or can be treated as a type of "awakened aurality" through which the listener begins to develop a more comprehensive awareness of their sonic environment.

This listening project is called "Locative Listening and the Construction of Dynamic Hybrid Space." While my exploration of hybrid space is concerned with the split between the real and the virtual, dynamic hybrid space introduces observations of how temporality exerts a powerful influence upon the experience. It is hybrid in that it is composed of two primary elements; the real; visual, vestibular, auditory, olfactory, and haptic stimuli, and the virtual; technologically-mediated listening experience. The term "dynamic" is used as a means of expressing the ephemeral nature of this form of listening.

(Locative Listening podcast by Tony Vieira)

As was the case with the locative sound pieces that I have discussed in this chapter, the blending of real and virtual sound experienced by the user, that I refer to as hybridity, is further expanded when the user begins to become aware of his real surroundings through his entire sensorium thus enacting the experience of sensorial heterotopia.

The Mediation is the Message

We can likely all understand that line of reasoning-exemplified by phrases such as “I was lost in the novel.” However, the reader cannot completely withdraw from the space of the train into the narrative of the novel. She is *both* in the train compartment and in the *space* of the novel. The experience of the narrative is shaped by the place she is sitting, as much as the experience of the place is shaped by the narrative. By immersing themselves in novels, readers are able to experience a place differently, for example, feeling that a subway trip is more enjoyable or by imaging a coffee shop as a personal reading room. The place of the reader can also influence the experience of reading. For example, reading while sitting next to people talking loudly on a bus can influence the reader’s concentration on the narrative. Neither can overcome the other, making it difficult to conceive of someone metaphorically “withdrawing” from space. At most, the book can fully occupy only one sense: the visual. Readers still experience the place they occupy through, haptic, aural, and olfactory senses. Rather, the book works as a filter by refocusing the visual sense.

(de Sousa e Silva and Frith 2012: 38)

As I began to write this section, I was sitting in a departure lounge at the Oslo Airport listening to binaural audio recordings that I made while in Bergen, Norway. I was in Oslo on the first of two layovers as I travelled from Bergen to Toronto, Canada. I travelled to Bergen in order to attend ELO 2015: *The End(s) of Electronic Literature*, the annual conference of The Electronic Literature Organization. I was invited to attend the conference by Dr. Caitlin Fisher, as she and I had co-created augmented reality and alternate reality narrative pieces that were being exhibited and screened. The first evaluation was written in the present tense, and I have chosen not to re-write it in past tense as a means of heightening the experience of mediation that I felt at the time. As I wrote the first evaluation, I was listening to one of my Bergen recordings

and evaluating the varying levels of immersion, virtuality, and mundane technological mediation, that these recordings would illicit in me as a passive listener. I was not listening attentively, but rather, treating this recording just as one would background music at a dinner party. I do not want to confuse this with ambient, or as I will refer to it, *situational sound*, which I will define as the “sonic ecologies that we encounter in everyday settings and whose attributes are beyond our control.” The *recorded* sound is assuredly the foreground of my sonic experience, but it is overlaid against my *real* sensorial environment. For the purpose of clarity, I will refer to recorded sound as “recorded” or “virtual” and to the real and present sound environment that surrounds me as I listen to the recording as “real.”

The knowledge gap in this listening scenario is precisely what creates the virtual experience. The VR conditions are generated, not by what is added to the real world, rather, by what the user is unable to identify as real or virtual. Admittedly this is, in essence, a very lo-tech VR experience, but no less immersive than one requiring an Oculus Rift or Meta headset. The intriguing attraction for me to this form of VR experience is that because it does not require expensive headsets (for which very little content is available at the time of this writing), digital 3D renderings, animations, or green screen video almost anyone with access to headphones can experience it. The more simple the earphones the better, as noise-cancelling headphones will be a hindrance to an immersive experience. The immersion is achieved through the blending of real and virtual sound.

From a content creation perspective, this is a true DIY (do it yourself) AR field, and one that requires no knowledge of programming languages or software programs to enter as an experience creator. As the creation of this content requires no software licensing or VR hardware,

the financial barrier to entry is less than \$200 to purchase a pair of binaural recording earphones, and any device capable of recording stereo audio.

Pre-recorded sound events that are part of a VR sound experience will, for the most part, be indistinguishable from sound events that occur in the real, present sound experience. This stands in sharp contrast to the current state of VR and AR in which the user is acutely aware that the generated material is not part of his real experience due to the nature of visual VR and AR. As the audio used in my current projects is all binaural, the user will experience sound in a spatial way, as if they had been present for the recording.

Locative Listening Initial Experiments

During my time in Bergen, I spent a great deal of time walking cobblestone streets as I travelled from my hotel to conference sessions and gallery exhibitions. During many of those walks, I recorded binaural audio of the very mundane sonic experience of a pedestrian, although when I listened back to the recordings after being back home in Canada for a few weeks, they seemed far more interesting than I had anticipated. Perhaps this was due to the spatial nature of the binaural recording technique or the difference in soundscape between a modern North American city and a Medieval Scandinavian city. Either way, this juxtaposition would inform the way I would approach soundscape creation for podcast and location-aware media projects. In the following section, I discuss my experience of auditioning binaural recordings created while in Bergen and reflect upon potential reasons for their power of sensorial heterotopia.

Norway recordings

The first recording that I will be reviewing and commenting on was made at the Bergen Harbour on a warm, by Norwegian standards, summer afternoon. (For the purpose of this evaluative narrative I will refer to myself (the listener) as “I,” and to myself (the recordist) as “my guide.” In addition, I have chosen to present the evaluation of my listening experience in the present tense. Shifts in my awareness of real sound events vs. virtual sound will be distinguished by reflections on real experience being presented in italics.

Bergen Harbour

I listen to my guide announcing the location of the recording and his intended path. I am immediately struck by the spatial depth of the recording. I hear seagulls approaching and crossing my stereo field of listening, a crescendo of conversation in Norwegian to my left that immediately fades to inaudibility as my guide walks past those in conversation with each other. The wind from the harbour becomes a distraction. *I just realized that I have not been aware of my real surroundings, with the exception of my laptop and coffee, for several minutes. I have been immersed.* I hear the sound of two men greeting each other in Norwegian, and I am unsure as to whether it took place in the real or virtual sonic environment. Now I am experiencing the sound of walking through the Bergen Fish Market, and the soundscape is almost overwhelming. I can hear vendors, tourists, and shoppers speaking in Norwegian, Italian, and English. “It is good sal-mon” is uttered through a thick Italian accent by a woman whom I assume is a tourist. I suddenly looked over my left shoulder to look at the machine that was approaching only to amusingly, and satisfying, realize that this was a street cleaning vehicle in the recording. This

sound is followed by a crescendo of sound events as my guide must have been approaching the exit to the fish market and the exterior sounds of traffic, seagulls, and people blended with the interior sounds of the fish market creating, what I am reluctant to label, a cacophony because it is not harsh or unpleasant, but it is powerful enough that I experience a sudden sensorial overwhelm that induces me to suddenly remove my EarPods and, resultantly, myself from the alternate sonic world. I once again am surprisingly aware of the fact that I have been almost entirely oblivious to my real visual surroundings, with the exception of my laptop and coffee, and unsure of how much of my real soundscape has been part of my listening experience.

Schizophonia and a Hallucinatory Sound Accident

... we are living in a time in which the two realms of the realized and the realizing (or the actual and the virtual) do not signify themselves as exclusive spaces; instead, the interaction between these spaces continues to become mutually constructive. (Farman 2012: 46)

The term “Schizophonia” was coined by R. Murray Schafer to describe a disassociation between a sound and its source of creation. This term exemplifies the nature of the deep locative listening experience that I will describe in the following example.

Reflection on a Hallucinatory Locative Listening Experience

I had just recorded 20 minutes of ambient sound within the departure lounge of the Oslo Lufthavn, removed the recording earphones and inserted listening EarPods in order to listen to this simple recording of mostly inconsequential background noise. What I experienced was far from inconsequential. Within the first two minutes I was startled by the sound of what (I typed

and then deleted the word “appeared” and replaced it with “seemed”) to be a shopping bag (heavy plastic material) being crumpled. This sound continued, with occasional silent periods, for what seemed to be well over a minute and was followed by the sound of dishes being clinked and clanked together, chairs dragged across the floor, and other ambient noises that created a heightened feeling of anxiety within me and made me feel as though I was watching a horror film. The feeling was so intense that I removed the EarPods just to get back to reality. I suspect that anyone reading this would label my account as exaggerated and melodramatic, but I assure the reader that every word is sincere. After several minutes of only real and present sound, I decided to listen to this audio again, this time as a focused listener and to observe my sensorial experience compared to when I was a passive listener. The experiential difference was profound. I listened with eyes closed and was bored to the point that I had to open my eyes again, and with my eyes open the experience was much more engaging. The soundscape in isolation was perceived as noise, but as an overlay to the real and present visual, it became cinematic. The slightest addition or subtraction within the sonic landscape, recorded or real, functioned as an instrumental solo passage in a piece of music. Drawing attention to a region of my sonic environment of which I had been unaware or perhaps aware but only peripherally. At times I became so immersed in the listening that I would display physical reactions to sudden or particularly affective sound events, which seemed to make a middle-aged U.S. woman a bit uncomfortable, as she has looked at me several times with an expression of confusion or perhaps concern. I feared that she would alert airport security to my behaviour and characterize it as a security threat.

I believe that this experience at the Oslo Airport was the moment when a floodgate slowly began to open, and a number of realizations about the power of technologically-mediated sound would become evident to me and inform my overall research project. This was true with regard to the potential for using technologically-mediated sound as a tool for experiential immersion in a VR and location-aware media, but also how the act of listening can be a form of mindfulness and its practice can help us to engage more deeply with our sonic world and with one another.

Chapter Summary

The preceding evaluations exemplify the nature of listening that I continue to explore in this area of my artistic practice. The power of these experiences has led me to believe very strongly that locative listening can be a meaningful auditory experience on par with reading a meaningful short story or entering a virtual reality environment. The technological simplicity of this type of immersive activity is such that it presents very little barrier to entry for the user who would require little more than a digital listening device, earphones, and a little bit of time. This is not an entirely new idea as there are numerous smartphone apps, as discussed and evaluated in Chapter 4, that provide the user with a variety of sonic experiences, although the vast majority of these apps guide the user through a specific location with accompanying soundscape or guided voiceover that provides historical context or points of interest for the tourist. The difficulty that I have found with most of these apps is that there is a barrier to entry due to the walks being location specific with the guide referring to sites and landmarks within the specific location (New York City, Paris, Berlin) that make the experience meaningful only if the user is physically

present in the place being described. In most cases, the user cannot even listen to the content unless they are in the specified location as these apps are GPS enabled and the content is only activated if the listener is within the GPS hotspot.

These apps have helped to encourage me that this type of listening is of interest, if only to a small number of people, and that my project is worth pursuing as an audience does exist for this nature of listening experience. It has also made it clear that there is a gap in the existing listening activities available and that locative listening can fill a niche in the spectrum of listening experiences for the smartphone equipped. In addition to mobile apps, there are podcasts that explore sound-based embodiment, although far fewer podcasts of this nature exist when compared to mobile apps. The few that I have found are either guided tourism walks or unguided, un-contextualized soundscapes.

My intention, with the artistic side of my research project, is to create a locative listening podcast series that would allow users to experience a wide range of sound pieces of varying duration (5 minutes - 20 minutes) under specified conditions. All sound pieces are to be recorded in binaural audio in order to heighten the sonic spatiality of the experience and to create a more realistic sonic immersion. Below is an example of the pre-listening instructions for one of my locative listening experiences:

In the Kitchen

- *Sit in a comfortable position in your kitchen*
- *Time of day does not matter*
- *Face the kitchen sink*
- *The lights should be on*
- *It is okay if others are in the home*
- *It is also fine if they momentarily enter the kitchen*
- *They should not engage you in conversation or create intentional visual distractions*
- *You should not engage anyone in any way during the listening experience*

- *Once the audio is finished, you should remain seated with the earphones in place for an undetermined period of time*

Problems with Locative Listening

The most obvious problem with the idea of locative listening is the barrier to entry for the user.

The problem is the tolerance of the user to engage in an activity that appears mundane compared to other technologically-mediated endeavours. Whereas a music playlist can be listened to while engaged in nearly any physical activity and the same could be said about a podcast, the level of focus required for locative listening is far deeper than mobile listening, and the situational specificity creates an additional requirement that can be a barrier.

This hybrid artistic/research project has provided me with a deeper understanding of a wide range of technologically-mediated experiences, meaningful evaluative reflection upon my own existing AR, VR and Alt R projects, and a great deal of focus and direction for my ongoing artistic projects exploring technologically-mediated sound. Not only did the reflection on and contextualization of my own work within the existing body of artistic practice in this field provide a sobering dose of humility but it also reassured me of the value of and need for purely sound-based hybrid reality work as an artistic practice.

Finally, my explorations in locative listening support my assertion that it stands in stark contrast to mobile listening concerning the degree of immersion that is possible for the user, and the embodied experience that the immersion can enable. My own experiences with locative listening have at times felt voyeuristic, and at others, performative. The “Hallucinatory Listening Experience” or, as I frequently refer to it, the “Oslo Experience” in the airport departure lounge felt as though I was part of a dramatic production or performance piece that was unfolding

around me, of which I was a part but was somehow invisible to the other cast members. Due to this experience, I sometimes characterize certain locative listening pieces as “evanescent art experiences.” Art that is not quite obvious due to the hybridity created by blurring the line between real experience and virtual experience. My role in the “Oslo Experience” was that of an interloper, ascribing meaning to the people in my real environment based on the blending of meaning creating by the hybridity of my sensorial experience. The experience at the moment was almost euphoric, as though an intoxicant had altered my reality, but when I have reflected on the experience, I have almost felt a sense of guilt for having looked at the real situation and its inhabitants with an understanding that belonged to a completely different set of human circumstances. I question whether this particular privatization of public space is somehow a breach of privacy for those around me as I engage in a hybrid reality experience almost at their expense.

Chapter 6

Conclusions

Introduction

Background and Context

After having spent six years creating AR, VR, and AltR projects I have learned a great deal about the practice of delivering immersive and hybrid experiences through mobile technology. But, due to the fact that this project has been about the experience of listening through technology it is a topic that is without end. Not only does technology constantly change, so too does our experience of listening through these devices and the networks that connect them, and us, to each other. Perhaps the near constant in this study is that of human perception and experience, but that too is variable due to the feedback loop that exists between technology and behaviour. That is, hardware and software designs change to suit user wants, needs, and desires, while user behaviour changes in order to better utilize the functionality of technology. Perhaps in my chosen field of research change is the only constant.

One thing that certainly has changed is the way that people react when I tell them that my research and creative practice are centred on augmented and virtual reality. When I began working in these fields the mention of AR and VR was mostly met with blank stares and quizzical expressions from people but thanks to *Pokemon GO*, a proliferation of VR games for gaming consoles, and a number of high profile documentary projects that utilize VR, the general public is becoming much more familiar with my field of research and creative practice. That being said, AR and VR are still far from commonplace experiences due to the necessity of

specific hardware and software, not to mention the patience required to endure the frequent glitches that are inevitable when interacting with emerging technologies.

While this dissertation has been about sound in XR environments it is also about our relationship with the technology that affords us the experience of these environments. The near ubiquity of the smartphone provides the creator of digital art forms with a nearly limitless audience for delivering content, particularly forms that exploit mobility and GPS as key elements of their delivery method, while providing the audience with a seemingly endless stream of content and applications for user experience and distraction from their IRL (in real life) experience. Ambient literature and location-aware storytelling have been of particular interest to this dissertation as they exemplify the type of hybrid media art that I have been exploring within my creative practice.

Mobile technology affords us the experience of shared embodied space, whether through the use of voice calling, texting, social media, or *Pokemon GO*. This shared embodied space enacts a kind of placemaking through the consideration of individual location and relative location to others engaged in the mobile communication or gameplay; and the fact that smartphones can pinpoint our location with great accuracy and, if we choose, can relay this location data to other users within our communication network. Although beyond the scope of this dissertation, it is of growing concern for many people that inherent in the pervasiveness of location-aware media is the potential for a loss of privacy and anonymity. I mention the privacy issue because I believe that these concerns can cause some individuals to avoid mobile experiences that require location services to be enabled on their smartphones. This is another

potential impediment to location-aware media experiences penetrating the general population as a mainstream form of smartphone entertainment experience.

My research structure can be distilled to three basic paths of inquiry. The first looked at historical examples of sound mediating technologies and their impact on the receiver of the resultant sound and, in some cases, the projector of that sound, and how location can play a role in the experience. Another important element of this first path was the notion of acoustic community and how some examples clearly created community as a result of the technological mediation and its far-reaching ability to reach the listeners' ears. The second path of inquiry investigates the ways in which sound is used in screen-based media as a means of engaging the viewers' sense of hearing in a novel way and/or how sound and silence are used as a means of driving a narrative. This second path of inquiry functions as a bridge between the past and potential future of mediated listening. The third path of enquiry investigates forms of mediated listening that use mobile and XR technologies as their mode of delivery. The knowledge of mediated sound use in traditional screen-based media informs both the creation and analysis of mediated sound in mobile and XR media discussed in subsequent chapters. As part of my third and final path of enquiry this research interrogates a variety of recent approaches to the delivery of mediated listening experiences as a way of better understanding the potential direction of listening through technology in a variety of forms of art and entertainment. Inherent in the second and third paths of inquiry is the question of user experience and how/if the XR projects in question engage the audience in a meaningful and memorable way. It was important to understand what made an effective project if I was to create such work myself.

Overview of Research Objectives and Findings

The first chapter of this dissertation presented the motivation and context for this study by providing background on the listening experiences that inspired the paths of inquiry undertaken in this research project. Seemingly disparate experiences of hearing the Islamic call to prayer, playing jazz gigs in cafes and restaurants, teaching middle school concert band, composing music for media, and developing XR projects established the ways of listening that informed this research project. These “ways of listening” include sound with regard to placemaking, community-building, entertainment, learning to listen, and sound as a device for immersion and sometimes for distraction. Working in the field of XR exposed me to a variety of AR & VR works as I researched existing projects in order to develop my own work with a hope of expanding the form in a meaningful way, both technologically and experientially. During my early years of working in XR I took every opportunity to experience examples of this new form of media content. The eagerness to engage with nascent media had me attending conferences and media festivals, scanning milk cartons and bus shelters, and visiting museums and galleries even if the XR content was only a peripheral component of the exhibition. My findings throughout this process eventually led to my chosen research topic.

Although many of the XR projects that I experienced were initially exciting (particularly because I had become a bit of an AR/VR geek) each new XR experience seemed to leave me with the same feeling as the last; as though something was missing. After many uninspiring XR encounters and much reflection the “something” missing was revealed to be twofold; purposeful engagement and intentional sound design. The XR work that I had been encountering, although in some cases technologically groundbreaking, did little for me with regard to creating a feeling of

immersion of sensorial engagement. Perhaps I wanted too much from this new media form?

Wasn't it enough to point my smartphone at a marker on a museum floor revealing an animated dinosaur on my screen that appeared to be standing inside the museum and within reach? It was definitely cool, but once I had scanned the marker and seen the dinosaur once I had no interest in repeating the process.

This realization was informative and led to more questions about the application of AR and VR. The main question was "what's the point?" What is the intended end user experience that justifies a user taking out their smartphone, downloading the required app, and scanning the AR marker or putting on a VR headset, messing up their hair, and fumbling with hardware while following vague instructions delivered by the docent assigned to the VR station? Perhaps lofty, but the ambition for my own XR projects became that of creating work that would not leave the user thinking "what was the point of that?" This would become all the more challenging as I began to create work that was purely sound-based.

The lack of intentional sound design was the second prong of difficulty that I was having with existing XR work. My initial intention was to create more meaningful sound design and music score, but this was short-lived. Although I did compose original music and sound scape for a several of my AR and VR projects I soon became intrigued by the idea of stripping away the visual and the challenge of sound-only XR. The task of engaging a user without ghostly apparitions seemingly floating in real space or a headset to block out IRL distractions would be a difficult one, so I would need to investigate the use of mediated sound to gain a better understanding of what was likely to be successful.

In order to achieve something close to the goal of meaningful sound-based XR experience I would have to study the act of listening through technology. Chapter 2 was an investigation of a variety of mediated listening situations that uncovered a great deal of information about the way that listening through technology can enact states of relation and connection between transmitter and receiver. This knowledge would prove valuable when analyzing, designing, and constructing sound-based work, in addition to informing the nature of the content and delivery approach that could illicit the desired response from a user of sound-only XR.

Mediated Listening in History and Lore

Chapter 2 provided background information and context regarding ways of listening through technology in history and lore. This research was necessary in order to establish the notion of mediated listening not as a novel human experience dependent upon mobile technology but one that has a long and varied history. In doing so, I argue that the goal of engaging users through mediated sound experiences is not only possible, but one that has a long history of successful examples. As a way of substantiating this claim, chapter 2 interrogated ways of listening that were dependent upon technological mediation. These forms of listening often imposed new meaning on social situations and established hierarchical structures between projector and receiver and at times the information imbedded within the projected sound (radio & *muzak*), the sound itself (resonance), or the nature of sound projection (call to prayer & sound as weapon) could exert power upon the listener. The investigation in chapter 2 unearthed ways in which mediated sound could be used to connect and/or control individuals or groups of individuals by the sheer power of wielding a sonic message. This knowledge functioned as a bridge between

early forms of mediated listening and the highly curated and edited sound in contemporary media discussed in chapter 3.

Sound as Immersion Enabler

Chapter 3 expanded on the discussion of mediated listening by analyzing and contextualizing sound and silence in television and cinema with regard to the way highly curated and edited sound can deepen the viewer experience. The listening experiences discussed in this chapter were focused on visually-based media in order to interrogate the most common form of contemporary mediated listening as a way of grounding the discussion within pervasive and mostly overlooked forms of listening through technology. The examples presented in chapter 2 begin to establish the argument that sound has the potential to be as powerful as sight in a media experience and that careful and thoughtful use of sound in visually-based media can function as a tool for deep viewer/listener immersion. Although this dissertation is about listening I argue that it is necessary to address listening to sound that accompanies the moving image in order to be able to begin to separate sight from sound. This is done in preparation for the chapter that follows and its discussion of a new aurality in which sound is given supremacy and is no longer simply playing a supporting role to visual content.

In chapter 4 this project focused on technologies and applications in which sound was the primary source of sensorial engagement, and the resultant forms of immersion and hybridity that are of particular interest to my research. The chapter begins with a discussion of contemporary forms of mediated listening that mostly go unnoticed yet function as information cues about the ways in which we interact with various technologies whose functions have little if anything to do

with sound production or reproduction. These examples serve as a way of being mindful of our interactions with technology and how we may be often guided by sound without being aware of it. The chapter continues with a discussion of the concepts of immersion and interaction within XR experiences. This clarification is a necessary grounding in specific forms of listening as a preparation for the analysis of sound-based mobile apps that follows.

The interaction analysis of mobile apps in chapter 4 explores the ways in which sound-based apps engage the listener in an experience that is minimally dependent on their visual sense. In some cases, beyond launching the app, sightedness provides no advantage to the user experience. The knowledge gained from this analysis serves as a way of better understanding how successful sonic immersion can be achieved through a carefully crafted and curated experience with a mobile app. This informs not only potential best practices when creating sound-based immersive and hybrid experiences but also provides a better understanding of the user experience within these environments. This analysis raised questions regarding mobile app user experiences that led to feelings of anxiety, fear, distraction, boredom, mindfulness, and a newfound awareness of the potency of engaged listening. This knowledge was valuable in that it affirmed my belief that sound-based experiences requiring little in the way of advanced technology have the potential to create powerful immersive and hybrid listening experiences. Early in the project I questioned whether VR goggles, iPads (under ideal lighting situations), and super-powered computer processors were the only way for someone to have a deeply immersive VR or AR experience, but this analysis of sound-based mobile apps made it clear that an equally immersive experience could be achieved with the combination of basic technology and a carefully curated listening environment.

The realization that immersive environments could be enacted through the careful combining of sound, technology, and place is at the core of my overall project, both with regard to research and creative practice. The knowledge gained from the investigations in prior chapters led to an analysis of my own work in AR and VR as well as that of other media artists with a next step of exploring sound-based projects that expanded the idea of immersion to include hybrid experience. The dominant investigation in chapter 5 is focused on the idea of locative listening and how this form of listening is related to and distinctive from other forms of mediated listening when combined with mobility.

Sound Immersion and Hybridity

Chapter 5 was a discussion of artistic practices that push the limits of mediated experience. Unlike common discussions of pushing limits in AR and VR that mainly relate to technological innovation such as computer processing, image recognition, and headset lenses, my interest is in designing the user experience through careful crafting and curation. The goal of a deep listening experience is achieved in my creative practice by engaging the entire sensorium as well as the imagination.

The work of Janet Cardiff and George Bures Miller is referenced as an example of a powerful hybrid experience that engages all the senses through mediated listening. The *Alter Bahnhof Video Walk* was a significant model for my hybrid listening work as it seemed to be able to enact a deeply engaging user experience with only an iPad and earbuds. This was precisely what I was hoping to explore in my creative practice; deep sensorial experience with minimal technology. I argue that minimizing the need for expensive technology is essential in order to be

able to bring these mediated listening experiences to the widest possible audience. Since the smartphone has become ubiquitous and many people already walk around listening to music and podcasts with EarPods it would be much easier to engage a mass audience with this form of lo-tech mediated experience. This approach to the distribution of experiential content is significant in that rather than waiting for the audience to enter the concert hall, gallery, or recital hall, locative media takes the experience to the audience and in the case of locative listening, hybrid experience is enacted for the user in a way that takes space and place into consideration, making location a significant element of the overall sensorial experience.

This dissertation has been about technologically-mediated sound. Rather than focusing on the various technologies that afford these kinds of experiences, my primary focus has been on the nature of the experience with regard to user interaction with the device, physical space, IRL and virtual sensorium. The ideal experience is one in which the user is engaged in all of the aforementioned ways but also that their imagination and memory are activated as a result of the content being delivered through the experience. Chapter 5 was a discussion of the elements that I believe to be significant constituents of a successful hybrid listening experience. This chapter also included a discussion of my own creative work in this field and the personal experiences and explorations that informed the creation of two sound-based location-aware media projects (*Strathroy Stories* and *Thing of Shapes to Come*). There was also a discussion of two previous creative projects that, although location-aware media works, were not purely sound-based. These projects were discussed as a way of tracing the lineage of my creative work in the direction of projects that use sound as the primary form of sensorial engagement.

In addition to a discussion of specific creative projects, chapter 5 provided a background on some of the terms used to describe the wide variety of experiences under the XR umbrella. The discussion of terminology also included an interrogation of terminology related not to the physical and technological characteristics, but with regard to user experience. These psychic spaces are enacted by mediating listening through technology and in some cases by placing sound-based XR experiences in particular locations. The use of specific locations led to the exploration of the idea of “locative listening” in which users experience technologically-mediated sound in a curated setting and under specific constraints related to location, body posture, direction of visual attention, etc.

Limitations and Future Work

One substantial limitation of my project has been the scope of my research with regard to limiting it to my own experience as creator and user of sound in XR. For the sake of concentrating on a research creation approach the decision was made early on to not include additional participants in this study. Although this approach did yield valuable information and raised many peripheral questions regarding potential applications of sound-based XR, I would like to undertake a future study that incorporates participants as both creators and end users of these technologically-mediated listening experiences.

At the end of chapter 4, *Pokémon GO* was briefly mentioned with regard to its functionality and user experience as a mobile app. Over the course of writing this dissertation it became evident to me that *Pokémon GO* embodies many of the key paths of inquiry of this project including placemaking, virtual embodiment, immersion, hybridity, and a sense of

community. The only problem being its use of sound as a secondary sense of user engagement. Aside from sonic micro-interactions during gameplay, the unique sound of each *Pokémon*, and annoyingly repetitive in-game music, this app is primarily a visually-based game experience and as a result, was not suitable as a substantial research element within this dissertation. I have, however, decided that it would be a useful model for the creation of sound-based AR experiences that are mobile and that it deserves further study.

Significance and Impact of this Research

This research project was inspired by a variety of personal experiences in which listening was in some way mediated through technology. As I began to look for such instances of mediated listening I soon realized that it was far more pervasive than I had imagined. From a conversation on a mobile phone to standing in line at Starbucks, my experience of sound was mostly a mediated one. Rarely was I able to recognize my auditory experience as one of purely direct listening. In almost every situation the real soundscape (sounds produced as a result of actions within the real physical space) was an element of a more comprehensive and mixed soundscape that included at least one element of acousmatic sound. This acousmatic sound would most often be in the form of pre-recorded music playing over speakers in the space. Whether I was in a coffee shop, doctor's office, standing at a gas pump, or in my own kitchen, a layer of acousmatic sound was nearly inescapable.

Soon after recognizing the pervasiveness of acousmatic sound I also came to the realization that with the exception of listening through noise-cancelling headphones, nearly all forms of technologically-mediated listening were in fact forms of hybrid listening. That is, most auditory

experience was a blending of direct and acousmatic listening. My observations of mediated earphone listening by pedestrians was extended to include everyday listening situations that did not involve the use of headphones. This broadening of focus led to investigations of the history of technologically-mediated listening in chapter 2 and sound and silence in media in chapter 3. Although I had not originally intended to explore these areas of listening it became evident that gaining a deeper understanding of listening experiences in a variety of mediated settings would be valuable to my research regarding sound use in XR.

By far the most common contemporary example of ‘self-imposed’ mediated listening involves a smartphone and in-ear headphones. Milena Droumeva characterizes the smartphone as “a technology central to the communications paradigm of participatory new media culture” (2007). As a result of their pervasiveness I argue that the ‘everydayness’ of the smartphone makes it the ideal deployment device for technologically-mediated experiences. Not only is the smartphone nearly ubiquitous but it also has the technological requisites (GPS-enabled, gyroscope, built-in speaker and screen, earphone connection, internet-enabled) for delivering a wide range of end user experiences that explore not only the technology but also its relationship to the individual, other smartphone users, location, and various communities.

The research creation that I have undertaken throughout this dissertation has resulted in the creation and deployment of a number of AR and VR projects that have exhibited internationally, but the most significant work with regard to the specifics of this document has been in the form of sound-only location aware media projects for the smartphone. The smartphone has proven to be the perfect ‘wall’ upon which to hang each piece with the real physical environment functioning as the ‘gallery’ throughout which users meander in order to experience the collection

of sound pieces of a given work. In the case of my most recent project, *Thing of Shapes to Come*, users were asked to walk around the campus of the National University of Ireland Galway or downtown Montréal, navigating the real physical world with the aid of GPS points on their onscreen map. This and other similar projects have proven both satisfying and informative to me as an artist and researcher.

The intention of this dissertation project has been to further knowledge and creative practices in the field of sound in XR with a particular focus on mobile hybrid sound art practice. Judging from numerous conversations that I have had following my own paper presentations and project exhibitions I strongly believe that my research will be of interest to both researchers and artists working in the field of mobile sound art and location-aware media. Whereas a great deal of literature exists that addresses listening, sound walks and sound in film, and a growing body of literature that investigates mobile media and the history of sound, only recently has there been a substantial interest in mobile sound art and location-aware media. This recent material is clearly a result of technological developments that allow for such experiences. I argue that my field of research is unique in that it addresses all of the above forms but funnels them through the lens and specificity of hybrid listening, with the smartphone as the delivery tool.

In his 2009 dissertation, Lewis Kaye states that “the concept of soundspace, in all three of its primary registers, makes human activity central to aural experience. It allows us to get past romantic notions about the purity of the natural environment and its pollution by the noise of technological society and recognizes the depths to which aurality is a social and spatial practice” (Kaye, 2009). I argue that all sounds exist within an egalitarian relationship and that listening to a secluded mountain stream is no more a mindful practice than that of intentional

listening within a bustling cityscape. My interest in hybrid listening explores this theme by suggesting that users can experience carefully curated soundscapes that blend with IRL sounds, blurring the lines between the real and the virtual. In doing so perhaps everyday listening in a variety of situations and settings can become heightened, and an act that is attended to with intention rather than substitutive distraction.

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Appendix

Strathroy Stories

Abstract (Orlando)

"Growing up in Strathroy was like growing up anywhere else. Drinking beer, fishing, murder, suicide, drinking beer."

Strathroy Stories is an immersive, spatialized sound piece that explores ideas of space and place through a series of adolescent and teenage memories of people, places, and events. This work examines the notion of memory as a dynamic, malleable construct that falls somewhere between archival and living narrative.

Guided by the memories of a small town boy, the listener will explore sites and events ranging from the prosaic; swimming at the town pool and hanging out at the arcade, to the aberrant; Turkey Festival murder and an ice fishing party gone wrong. Created as a *locative listening* piece, the end user is encouraged to listen, as they would a music playlist, while they walk to work, ride transit, clean the house, or walk their hedgehog. This piece is intended to enable a hybrid listening experience where the listener will be at times unable to distinguish real from virtual, thus creating a sort of *schizophonic* low-tech AR experience.

Users will be asked to download a free mobile app (*ECHOESxyz*) that will enable them to listen to sound pieces as they navigate The University of Central Florida campus. This *locative listening* experience will allow conference attendees, and anyone who has downloaded the app, to experience *Strathroy Stories* that will be mapped to The University of Central Florida campus as an overlay of the town of Strathroy, Ontario.

Conference Didactic (Victoria)



Growing up in Strathroy was like growing up anywhere else. Drinking beer, fishing, murder, suicide, drinking beer.

Strathroy locations of personal significance have been sonically mapped to the UVIC campus. Download the RECHO app using the QR Code, plug in your earbuds, launch the app, and move toward a sonic hotspot to listen to a Strathroy Story.

Figure 1: *Strathroy Stories* Conference Didactic (Victoria)



iOS



ANDROID

Figure 2: QR codes for Recho mobile app download (app is no longer available)

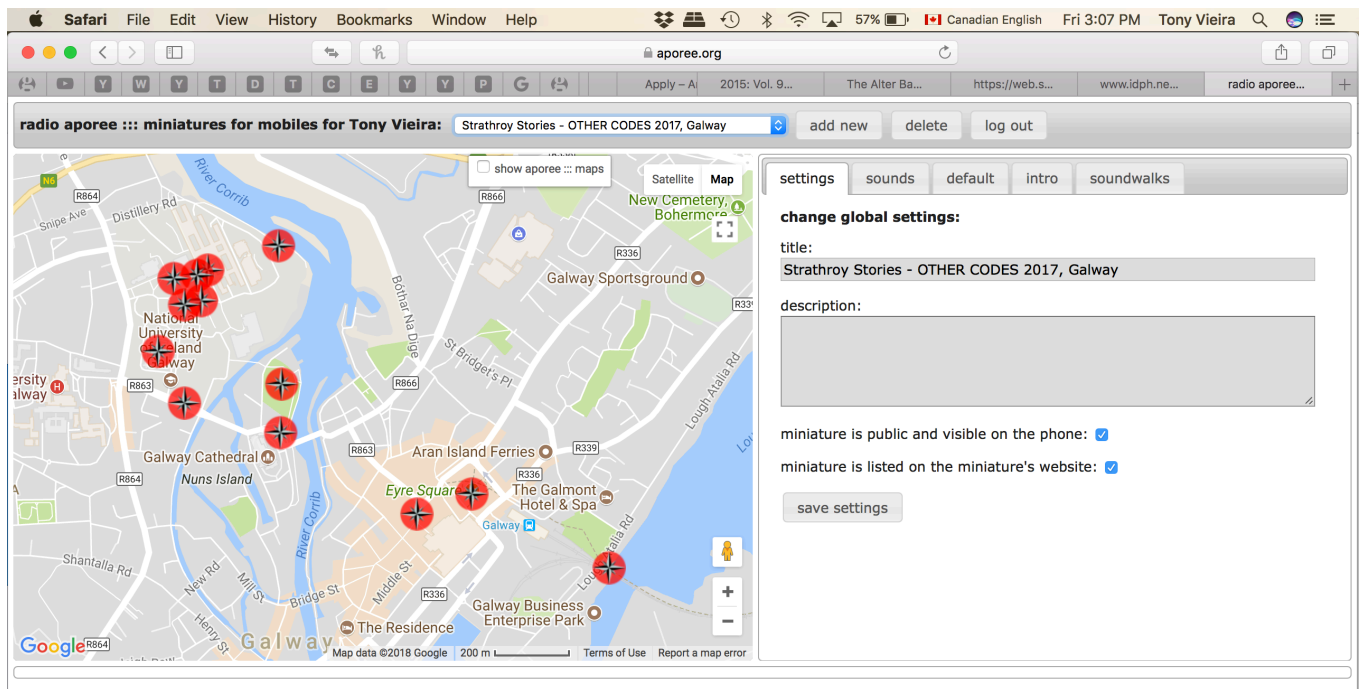


Figure 3: Radio Aporee desktop interface: *Strathroy Stories*, Galway, Ireland

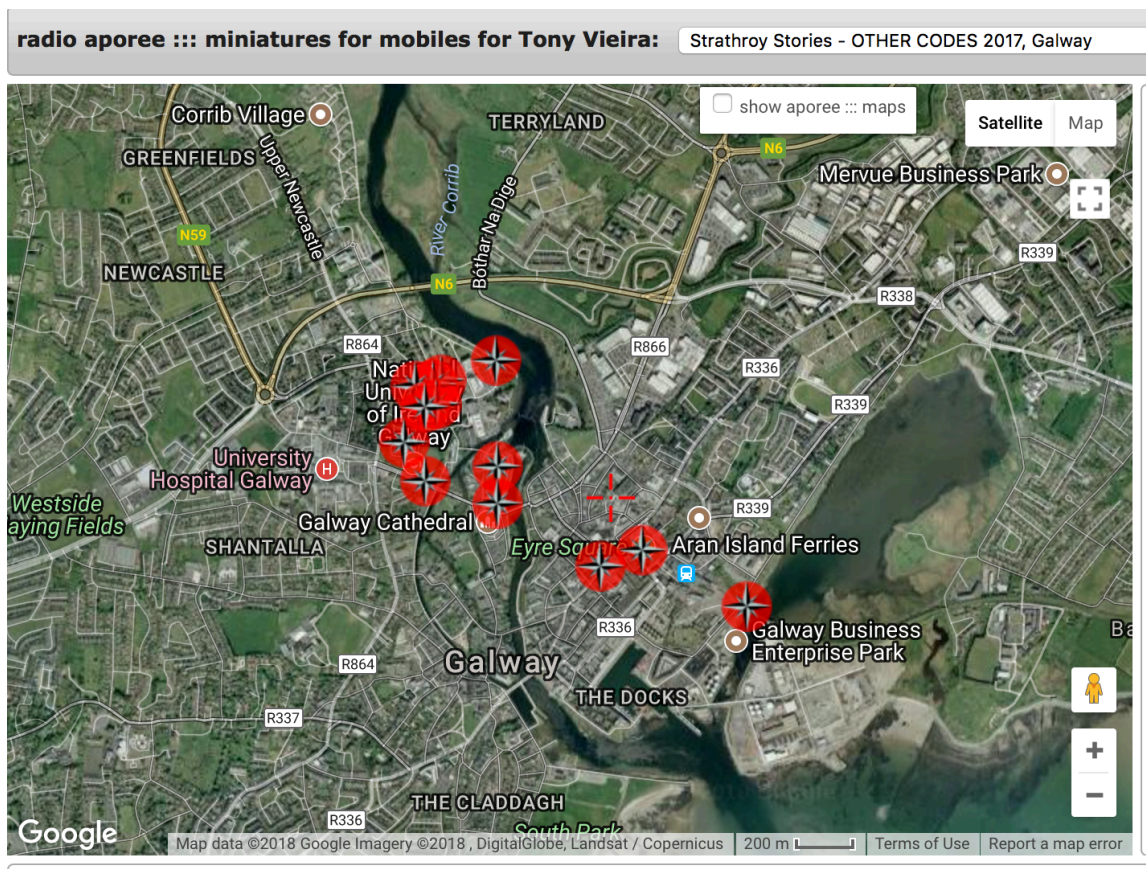


Figure 4: Radio Aporee desktop interface: *Strathroy Stories*, Galway, Ireland (satellite view)

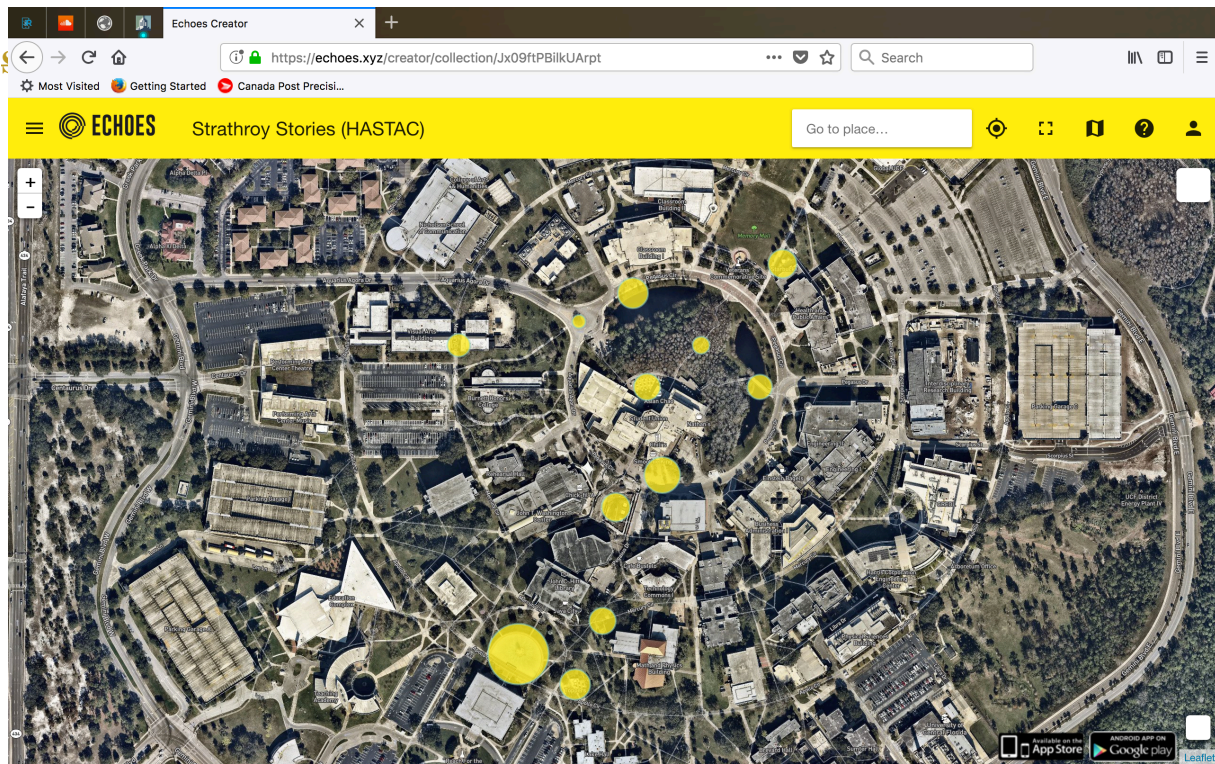


Figure 5: Echoes.XYZ Creator Page: *Strathroy Stories* (Orlando Campus)

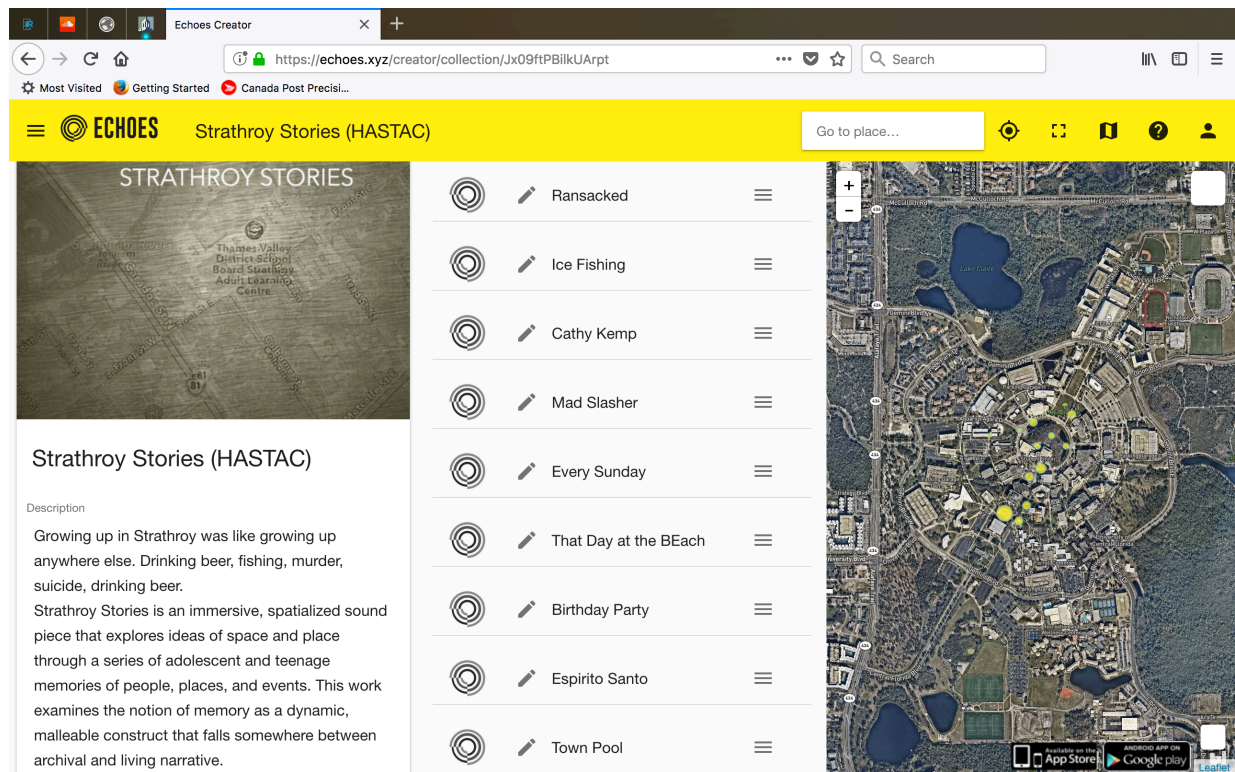


Figure 6: Echoes.XYZ Creator Page: *Strathroy Stories* (Orlando Campus close-up)

Stories

Reptile show birthday party

I remember hearing a story about a birthday party accident that happened when I was a teenager. It's was some kid's 11th or 12th birthday and his parents, who were kinda loaded, thought it would be a great idea to have live animals to entertain their son and his friends. At the time there was no such thing as a reptile show, but the dad knew a guy who owned one of those roadside zoos. The kind you drive past but never visit. So this guy brought some animals to the birthday party and had a handler, his nephew Jimmy, show off the animals one at a time for the kids. They loved it. First a painted turtle, then an armadillo, then a python, and, finally, a 7 foot long American Alligator. The kids were amazed. They were quite and hanging on the handler's every word. He told them that the alligator could be spooked if they shouted and moved too suddenly, so they kids just watched. While the handler was showing off the alligator and spewing facts about its diet and behaviour he apparently had an epileptic seizure. This frightened the alligator. While Jimmy was convulsing on the ground the crocodile jerked at the leash that was wrapped around Jimmy's wrist. Eventually slipping it completely off his wrist. The alligator began to chase the kids, and attacking them. All of these 11 and 12 years olds frantically ran in every direction, some out of the backyard and onto the street. Many of them jumped into the swimming pool. The alligator jumped into the swimming pool and begins to attack and kill the children.

Ice fishing with a puppy

My sister told me a story about the one and only time that she and her husband, Joe, went ice fishing together. Their close friends, Melanie and Brian, went with them that day. Melanie had just bought a new puppy. It was a shih tzu named "Snickers." They arrived at the lake just before noon. The frozen surface was snow covered and dotted with what looked like large outhouses, but were in fact ice fishing huts. The two couples crunched their way across the frozen lake until they arrived at their hut. Number 17. Once inside the hut they started a fire, something I did not

know could be done while ice fishing, and they opened the 2-4 of Molson Canadian. Canadian was always the beer of choice when I was growing up.

My sister said that all of them, except for Melanie, put lines in the water. The puppy wouldn't stop barking and Brian kept telling it to shut up, Melanie would tell Brian to shut up, and Brian would say something more offensive to Melanie. Things were getting kind of heated when Joe felt a nibble on his line. He reeled it in and there was a nice-sized pickerel on the hook. Before he could get hook out of the fish's mouth Melanie's dog jumped at the fish and when he did he fell right through the hole in the ice and was immediately gone. Melanie started screaming, Brian was telling her to shut up, my sister tried to calm her down, and Joe just worked on getting the hook out of the fish's mouth and gills. My sister and Melanie walked out of the fishing hut to see if the dog had surfaced at another fishing hole. As they walked to the next hut they looked down and the cleared snow and could see the frozen lake surface. And below the ice was Snickers doing a doggy paddle. My sister said that Melanie was hysterical. Crying and screaming. Just following her puppy as he slowly moved with the current. Paddling his little arms and legs, instinctively. Then he disappeared under the snow covered ice and wasn't seen again. They walked back to Hut #17. Joe and Doug were sitting with lines in the water, drinking beer. The girls sat for a while as they guys continued to fish. But Melanie's crying was so loud and constant that Brian couldn't stand it any more. He said that she was scaring the fish away. So after about half an hour they packed up the fishing gear and 2-4 of Canadian and went home.

Turkey Festival/Wayne Gretzky visit murder

Growing up in Strathroy was like growing up anywhere else. We looked forward to the end of the school year, because a few days after school was out the carnival would come to town and transform Alexandra Park from a grassy playground to summer festival site. Our carnival was called The Turkey Festival. A company called Cuddy Foods is based in Strathroy and at the time it was Canada's largest poultry producer. They decided to give back to the community by putting on the annual Turkey Festival. Rides, vendors, cotton candy, impossible games, live bands, and carnies. The first ever Turkey Fest was in 1978. I had somehow come to believe that Wayne

Gretzky was the celebrity attendee that year, but years later my brother in law told me that it was actually Eddie Shack.

There was a murder during that year's festivities. Apparently there was a bar fight after last call at The Derby Inn. The rough bar in town where fights were common, but not like this one. The fight started inside but eventually continued on the sidewalk outside. It ended with one of the guys getting stabbed several times. He held himself up by grabbing onto the bright yellow box that controls the traffic lights at the intersection of Caradoc and Front Street. His bloody hands left marks on that box that my friend, Macie, and I would stop to look at it on our way to school. I remember those bloody hand prints on that box for what seemed like years, and wondered why no one ever took the time to clean it. We made up stories about how no one could clean the blood stains and that they just washed away over the years.

The Town Pool

With the end of every school year came the first day of summer. And that meant the opening of the town pool. That pool is what I remember most about Strathroy. A perfect summer day would involve swimming at the town pool from 1-4pm, then, if my mother let me, again from 6-8pm. I think that every major life event of my youth took place in the pool, on the deck, in the filthy change room, outside the concrete hull of its elevated exterior shell, on the sloped shoreline of the Sydenham River (that meandered through Alexandra Park and behind the town pool), or at one of the seemingly endless memory hotspots throughout that park. Alexandra Park was my adolescent Manhattan. Sad, I know. But at the time that lousy, rundown park held a world of adventures and possibilities. No matter how hard I try, I can't think of anything that is as exciting to me as an adult, as that park was to me as a kid.

The Night that a car drove through my house

When I was 4 1/2 years old a car drove through the front wall of my parents' house. That was my room. At the time my Uncle Fernando was visiting from Sao Paolo, Brazil. He was staying in my room. I remember hearing a lot of yelling and noise, then walking down the hall to my room and passing Uncle Fernando in the hallway as he brushed plaster dust from his face and hair. I remember standing in the doorway to what was my bedroom and seeing a glowing headlight poking through the brick wall and my sister's Thumbelina doll lying on the carpet, covered in dust. I still don't know if I actually remember any of this, or if I just heard the story being told and created the memory for myself. Randy Lawson/Godmother death weekend

It was a Saturday morning in the spring of 1994. I was home for the weekend from university. On Saturday morning my mother got a telephone call telling her that my godmother had been killed. Hit by a train while crossing the tracks to buy fresh bread from the Portuguese bakery. They said that she stood on the tracks and let the train hit her. They said it was suicide. Because she felt guilty for putting her husband in a retirement home. The following morning I got a phone call from my former guitar teacher's ex-wife. She told me, in a matter of fact and unaffected tone, that Randy had killed himself the night before. After he finished a playing a gig with his band at The Derby Inn he went to Alexandra Park and shot himself in his car.

Chris Magee Serial Killer

From 1974 to 1976 Strathroy was gripped with fear because a serial killer was on the loose. Everyone was calling him the "Mad Slasher." He raped and killed three teenage girls and everyone thought that they or their child could be next. I was only 5 at the time but I vaguely remember my mother being even more strict with my teenage sisters than she usually was. And she was always very strict. Portuguese girls in Strathroy in the 70's didn't go out with friends, have boyfriends, or do anything really. During those years the doors were always locked, and after dark everything seemed little eerie. He was eventually caught. His name was Chris Magee. He was found not guilty by reason of insanity in 1977, and has been held at the maximum security Penetanguishene Mental Health Centre ever since.

Cathy Kemp hit by train

When I was in grade 10 my Math teacher was Mrs. Campbell. I sat in front of a girl named Cathy in Mrs. Campbell's class. Cathy was a rocker chick. Leather jacket, smoker, Led Zeppelin concert shirts. She didn't say much, but when she did it was usually brief, punctuated with the word "Fuck" in some form, and ended with a short breathy laugh. One Monday morning she wasn't in class. In the cafeteria at lunch everyone was talking about how she had been hit by a train on the weekend. They said she was high and had fallen asleep on the tracks and that the engine driver didn't know that he had hit anyone until the train arrived at its next stop in London. Someone saw pieces of clothes and flesh on the front of the train. For a long time after that I had talked to Cathy more than I had. I felt like I knew the dead girl and would say that she sat behind me in Math Class. But I never really knew her.

Esperito Santo Festival

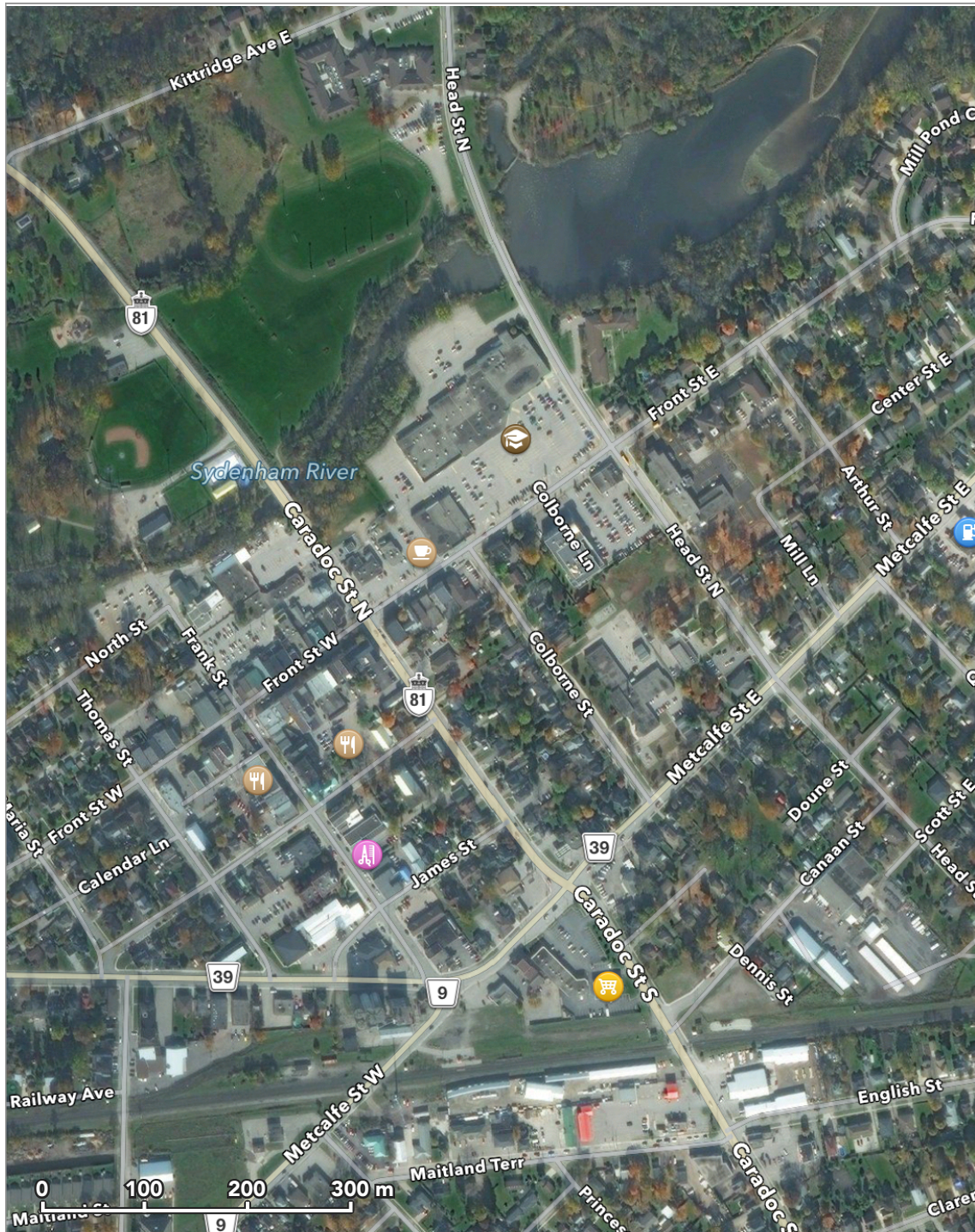
Every summer in Strathroy began with conflict for Portuguese kids like me. Go to the Turkey Festival or goto the Espirito Santo Festival. We called it the Feshta. They both took place on the same weekend. The first weekend of summer. It was a very exciting few days every year.

Definitely the most exciting few days of the entire year. On that Saturday every year my mother would make sure that the house was extra clean and we would wait around all day for the annual visit by three Portuguese men who would visit each home with a "promesia". Essentially an unsolicited delivery of sweet bread, a slab of fatty beef, and a bottle of homemade wine.

Homeowners were expected to: kiss a silver-plated crown, I don't remember any wiping of the crown between kisses, offer beer to the delivery men before they got back into their rented van enroute to the next Portuguese-household, it was the seventies, and pay a preset exorbitant amount of cash for the goods. I have no idea where that money went.

Map of Strathroy

near Strathroy-Caradoc — Middlesex



1 of 1

Figure 7: Satellite map of Strathroy

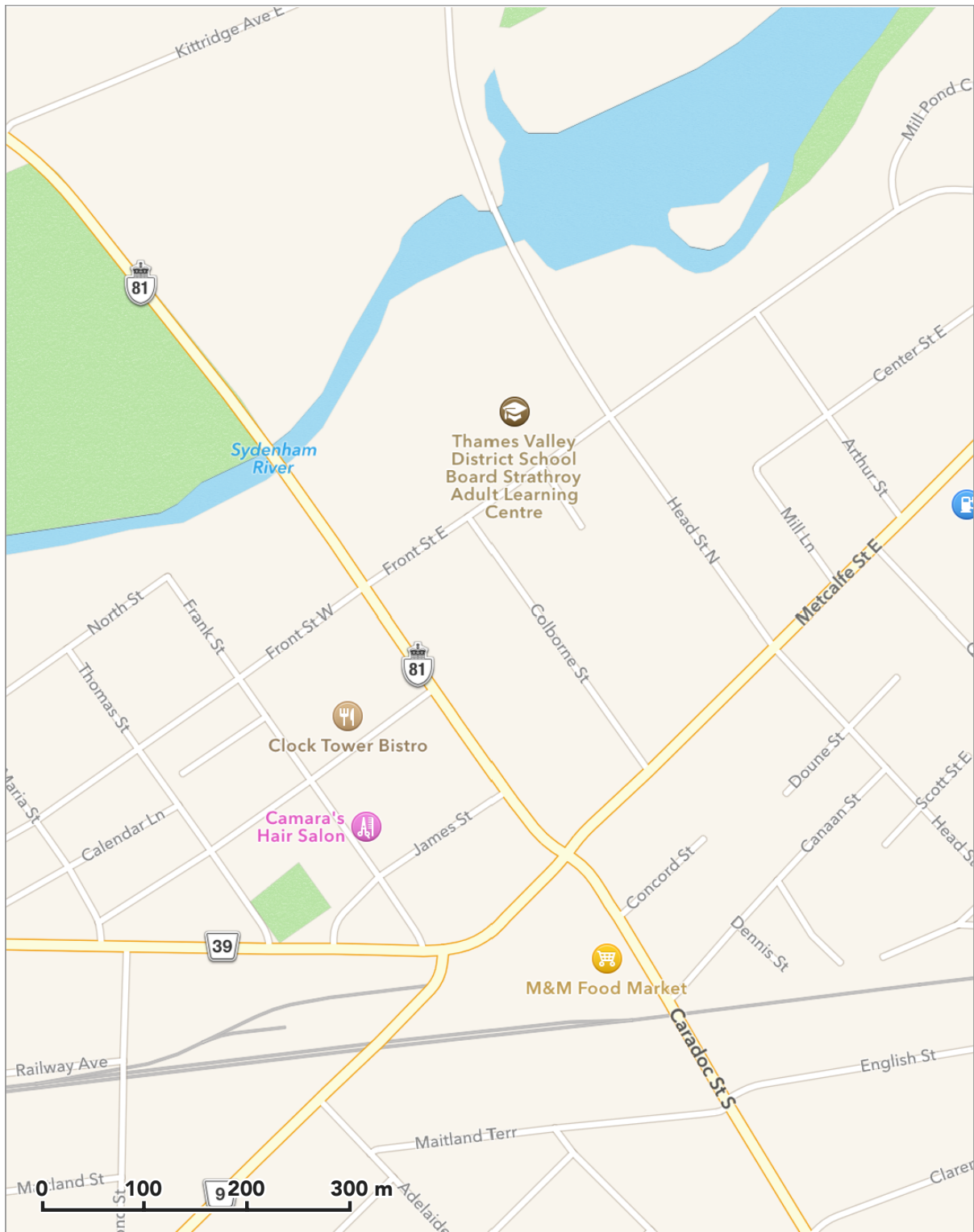


Figure 8: Map of Strathroy



Figure 9: *Thing of Shapes to Come* cover art

Thing of Shapes to Come

Scripts and Concept Notes

Pangea Proxima

Desperate and widespread efforts to extract carbon fuel resulted in all nations utilizing a wide range of methods, mostly variations of fracking, to extract as much energy as possible. Scientists believe that this is what caused the sudden and dramatic tectonic movement, resulting in a land mass known *Pangea Proxima*. *Yesterday*, when the convulsions started, everyone thought it was the end of the world. After countless years the earthquakes stopped and the rebuilding began. Legend has it that the Atlantic Channel was once a vast body of water, but now it's just a sliver of safety between us and America. The constant danger of refugees fleeing through the eastern parishes of New York State and flooding our borders has created a climate of hysteria and isolation. The refugees are allegedly fleeing social media persecution, and once they cross the channel many are captured and sold into slavery in Alkebulan.

Do you ever feel alone?

It's nice to have more than one world as your heart's home

We went for a walk in Griffith Park. It was so beautiful. We hiked all the way up to the observatory, but by the time we got there it was closed. We did get a nice view of the Hollywood sign. Then we drove to Venice Beach. It's hard to decide what I loved more... the energy of Hollywood Boulevard at night, or the waves of the Pacific Ocean on Venice Beach.

Richard asked whether I liked to play video games? He told me that a full day in Minecraft is only 20 minutes long in the real world. That means that one day in reality is like a month and a half in his *free time*.)

The next day we drove out to Santa Monica Pier. We rented bicycles and rode all the way to Venice. It took me a while to find my balance. I had never been on a bicycle before. Once we returned the bicycles to the rental shop it was almost dark. We walked along the pier again and watched the surfers. Richard said he was going to teach me to surf. But I didn't tell him that I don't know how to swim. I don't know anyone that knows how to swim any more.

He said that he doesn't even know where I'm from. I told him that I don't want to talk about that.

It's nice to have more than one world as your heart's home.

Umwelten

Ever since the Government Ministry of Interpersonal Conduct was expanded to include the new sub-ministry known as the Ministry of Virtual Conduct & Relations, our *free time* has been strictly controlled. *Simulation Reality* apps and hardware have become regulated technologies and the only way to gain access is through an official ministry prescript, or the illicit market. Ever since I died I've been spending way too much time on the Deep Web. Mostly travelling the *Onion Route* trying to make contact with people with whom I can trade *bilhetos* for *free time* access.

I knew I had to let go. I wasn't being fair to Richard. There was so much he didn't know. So much he could never know. He couldn't possibly understand. Even though what we had was never really real, I knew it would be difficult, letting go.

“The Social Sphere of Personhood”

I saw so many of my connections taken away and reconditioned to suit their previously chosen personal narratives. They would never be able to have *free time* again, and would forever be bound to their corporal *verdade*. This frightened me more than anything else. More than losing Véronique. Even more than losing Richard. Our *verdade* was nice, but more and more it felt like prolonged punctuation between my moments of *free time*. She didn't even know that I still had *bilhetos*. I didn't want her to know because she would expect me to share them with her. I couldn't give up any of my *free time* with Richard. It was the only thing that kept me sane. The only way I could stay in a relationship with her. I know that tomorrow when I die all of my profiles and *free time* data will become communal. I also know that this will hurt Véronique. Maybe then she'll really understand me. I try not to think about it. It won't matter anyway. My *verdade* will be gone then. All that will be left are my *sonhos*. The only gospel that I really want to hold on to.

Irrelevant

Richard told me a story about a man in America who lived in the woods for 27 years. He was not seen by another human being for 27 years. He would occasionally see someone from a great distance, but he was very careful never to be seen. (Do you ever feel alone?) He said that he couldn't accurately describe what it felt like to spend such an immense period of time alone.

Silence does not translate into words. “It’s complicated,” he said. “Solitude bestows an increase in something valuable. I can’t dismiss that idea. Solitude increased my perception. But here’s the tricky thing: when I applied my increased perception to myself, I lost my identity. There was no audience... No one to perform for... There was no need to define myself... I, became irrelevant.”

The Water in my Heart has Fallen

Véronique confronted me about my *free time*. She had seen a post about Richard attached to a connection suggestion. In it, he mentioned having gone to Santa Monica Pier with Elizabeth. Me. He posted a pinup of the two of us on the ferris wheel. It seems that my avatar bears a little too much resemblance to the gospel me. I lied to her. I denied that it was me. I laughed and said how funny it is that someone is pretending to be me. She that I should report it to the Ministry of Virtual Conduct & Relations. I said I would. But of course I didn’t. It almost scared me enough to expunge my profile. But then I remembered that all of my *bilhetos* were traded on the *Onion Route* and were untraceable. As horrible as it would be for Véronique to find out about Richard, it would be far worse if she knew what I was trading for the *bilhetos*. Yesterday there was only *verdade* and *sonho*, but lately there seems to be another *camada*. A layer that has formed between gospel and *free time*. *O caminho*. The things that I’ve done and continue to do that allow my *free time* access. What I feel about it is more than shame... The water in my heart has fallen.

I wouldn’t know where to begin

1. **What brings you here?** I don’t feel right.
2. **Have you ever seen a counselor before?** No. I’ve never needed one until recently.
3. **What is the problem from your viewpoint?** Dishonesty.
4. **Who is being dishonest?** Me.
5. **How does this problem typically make you feel?** Guilty.. Horrible.. Manipulating..
6. **What makes the problem better?** Not thinking about it and just enjoying the moments.
7. **If you could wave a magic wand, what positive changes would you make happen in your life?** I don’t know. I wouldn’t know where to begin. It’s so complicated. So impossible.
8. **Overall, how would you describe your mood?** Sad... Lonely.
9. **What do you expect from the counselling process?** I don’t know. I suppose I just want to be happy.

Exodus

American refugees continue to flood our borders. After making the perilous journey to cross the Atlantic Channel, they still must find a way over, around, or under the border wall. For those who arrive safely, there is still the danger of capture and trade. Some for bilhetos. Some are traded for other slaves who have “skills” that better suit the traders’ clientele. Those who manage to make the crossing and not find themselves enslaved, just seem to disappear. Some people say that they’ve established subterranean colonies with tunnel entrances in the woods just outside the city walls.

Freetime used to be like living a new life. A better life, in so many ways. One without the burdens of expectation and responsibility. The promise of never getting bored of anything, or anyone. But the more hours I logged in *Freetime* the more connections and relationships were formed. Then they began to have expectations of me too.

It’s funny. When you’re escaping from something, you never imagine that your refuge will one day become just another prison.

It doesn’t look like anything

Yesterday I was contacted by the Ministry of Virtual Conduct & Relations and assigned an additional meta tag based on the results of my therapy session. I told them that I’ve wanted to stop. That I know I need to stop. That every morning when I wake up, I promise myself that I’m going to stop. But the very same day, when night falls, I know that I’m going to do it again.

I had a nice dream about Richard a few days ago. I guess that’s all he is now. Someone in my memories and dreams.

When Captain Cook/Columbus/Magellan arrived at the coast of Australia/Cuba/South America, the native people completely ignored him, him, him, his crew and vessel; presumably because huge ships were so alien to their experience that "... their highly filtered perceptions couldn't register what was happening, and they literally failed to 'see' the ships."

Little Bits

- You always come for less than you leave with
- Oh, for fuck sakes. What have I done?
- The only word to describe it, is Compersion
- Véronique told me about how she was beaten and sexually abused by her freetime stepfather
- Bound by neo-tribal affiliations
- No longer bound by neo-tribal affiliations
- Personal identity
- She frequently replays the scene in freetime, because she says it makes her feel loved
- I've traded everything, even the innocence of my own children
- The water in my heart has fallen
- It doesn't look like anything
- The individual is eventually absorbed by his or her marketing demographic
- ee-tit-ned-i lan-os-rep
- Counting to ten in Gaelic

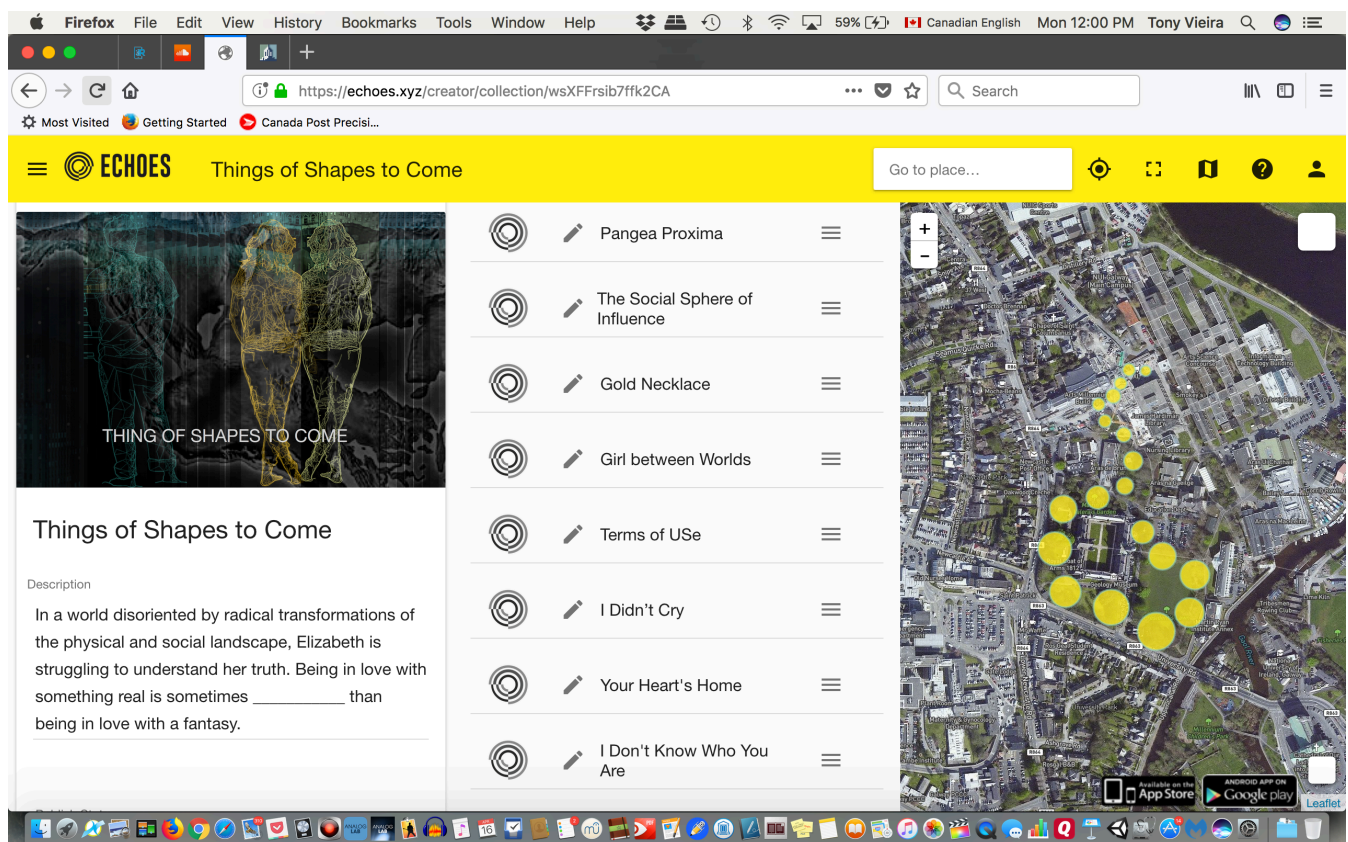


Figure 10: Echoes.XYZ Creator Page: *Things of Shapes to Come* (Galway, Ireland)

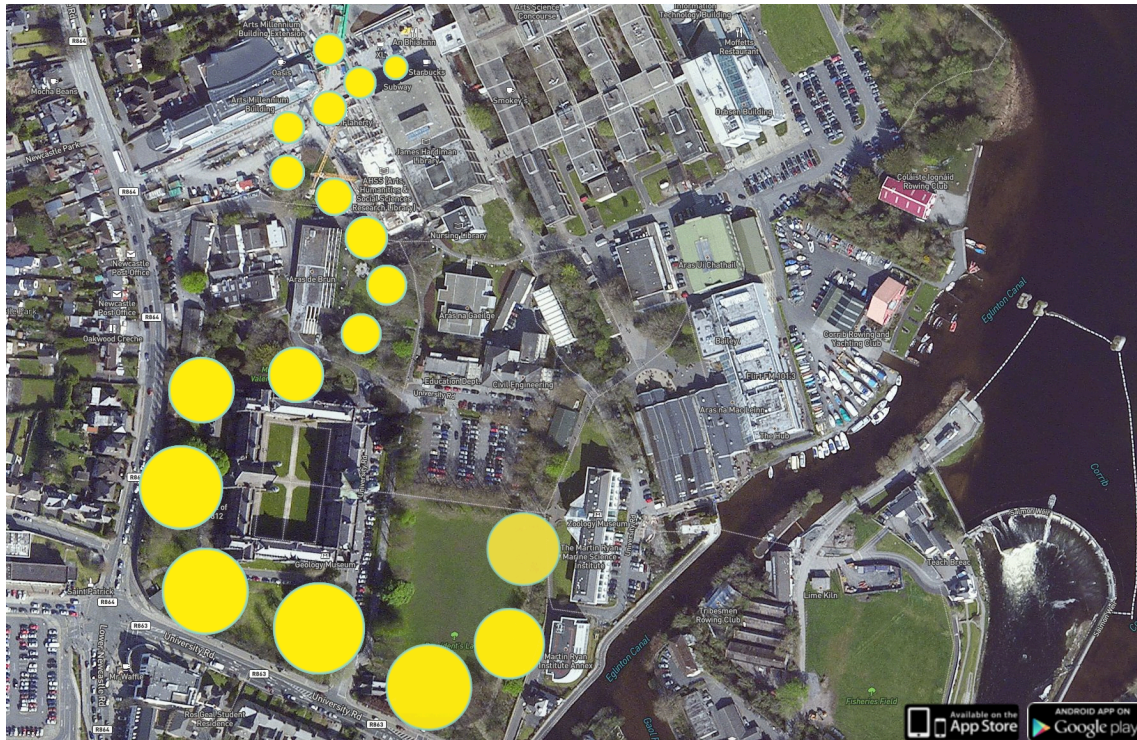


Figure 11: Echoes.XYZ: *Thing of Shapes to Come* (Galway, Ireland Satellite map)

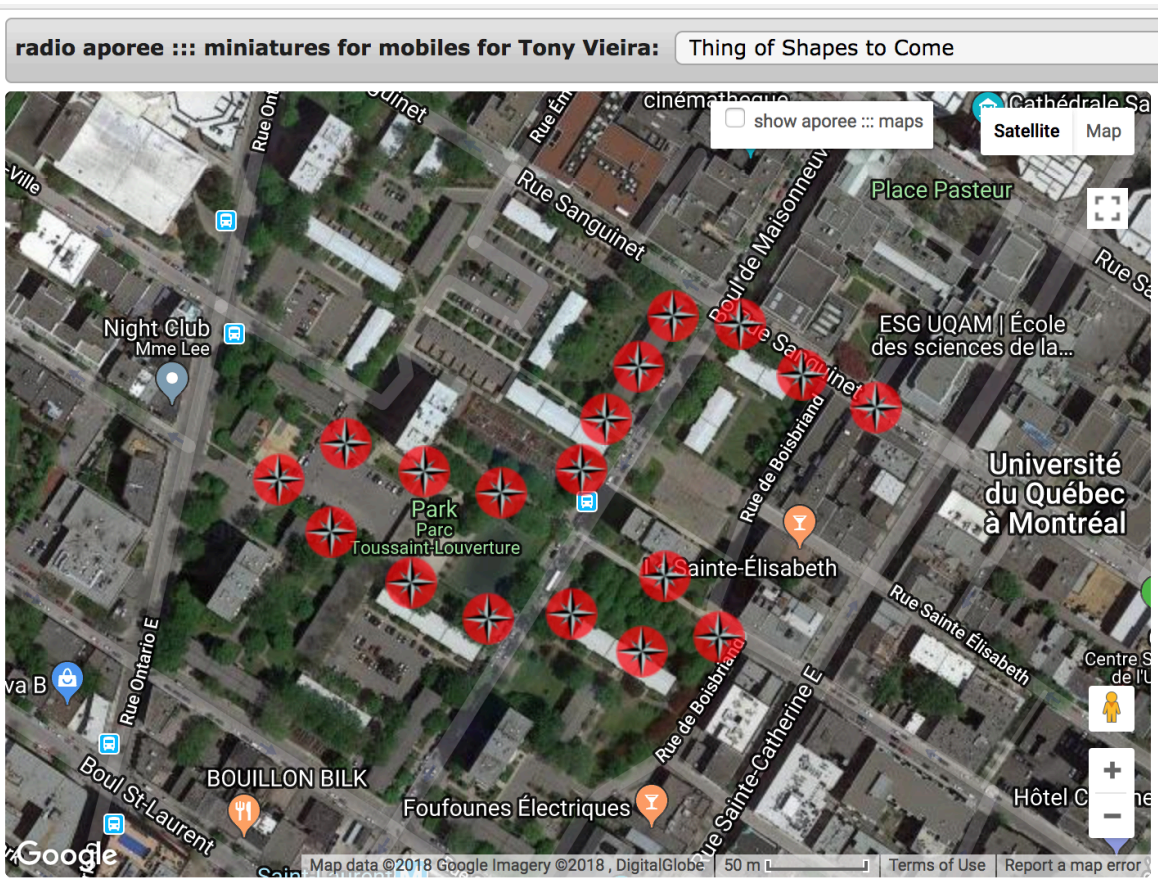


Figure 12: Radio Aporee : *Thing of Shapes to Come* (Montreal, Canada Satellite map)